

BIO-SECURITY in 4-H Animal Science

A Project Curriculum ♦ Volunteer Guide for 4-H Youth Ages 9–11

3A



Maps, Good Recordkeeping, and Tracking Animal Movement



MARTIN H. SMITH, Cooperative Extension Youth Curriculum Development Specialist, University of California, Davis; **CHERYL L. MEEHAN**, Staff Research Associate, UC Davis; **JUSTINE M. MA**, Program Representative, UC Davis; **JENNIFER TECHANUN**, Student Assistant, Veterinary Medicine Extension, UC Davis; **ADELE B. MOSES**, Student Assistant, Veterinary Medicine Extension, UC Davis; **JUSTIN N. LIANG**, Student Assistant, Veterinary Medicine Extension, UC Davis; **LINDSAY S. MALCOLM**, Student Assistant, Veterinary Medicine Extension, UC Davis; **ZULEMA VILLA**, Student Assistant, Veterinary Medicine Extension, UC Davis; **JOYCE CHIANG**, Student Assistant, Veterinary Medicine Extension, UC Davis; **H. STEVE DASHER**, 4-H Youth and Community Development Advisor, UC Cooperative Extension, San Diego County; **JEANNE L. GEORGE**, 4-H Youth Development Advisor, UCCE Tehama and Glenn Counties; **RICHARD L. MAHACEK**, 4-H Youth Development Advisor, UCCE Merced County; **KARIN TUXEN-BETTMAN**, Graduate Student Researcher, ESPM-Ecosystem Sciences, UC Berkeley; and **MAGGI KELLY**, UCCE Specialist, ESPM-Ecosystem Sciences, UC Berkeley.

Curriculum Overview

Animal Science projects are a cornerstone of the 4-H Youth Development Program. Many 4-H youth enroll in these projects, and the majority focus on the rearing and husbandry of market animals, including poultry, ruminants, and swine.

The activities in Module 1 of this curriculum teach youth how contagious diseases spread among livestock. Module 2 focuses on recognizing and addressing disease risks that are present at home or at any given fair or livestock event. Modules 3A and 3B (choose one or the other for your group) have activities that address the issue of tracking animal movement, including the use of Global Positioning System (GPS) technology in 3B.

PRE-ACTIVITY



Where in the World Is Tuolumne County?

Subject Overview and Background Information

How do you read and find a **point** on a map? What you should look for first are the vertical and horizontal lines on the map. The vertical lines (running up and down) are called **longitude** lines and the horizontal lines (running left to right) are called **latitude** lines. One longitude line in particular, known as the **Prime Meridian** (or the Greenwich Meridian [pronounced *gren-itch*], because it runs through Greenwich, England), divides the earth into the Eastern and Western **Hemispheres**. The latitude line that divides world maps into the Northern and Southern Hemispheres is called the **equator**.

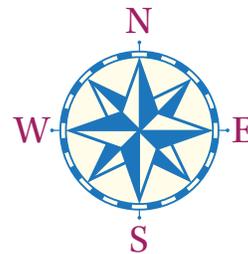
The earth is a **sphere**, and **cartographers** divide its area into 360 degrees (360°) of longitude, running 180° to the west and 180° to the east from the Prime Meridian (0° longitude). North-south measurements begin with 0° latitude at the equator and go up to 90° north at the North Pole and down to 90° south at the South Pole. N or S must be written to distinguish north from south latitude, and E or W must always be written to distinguish east from west longitude.

A point on a map where a longitude and a latitude line **intersect** (cross) is called a **coordinate**. For example, the general coordinates for Paris, France, are 48°N , 2°E . The first part of the coordinate shows degrees ($^\circ$) latitude, indicating the relationship of that location to the equator (N or S). The second part of the coordinate shows degrees longitude, indicating the relationship of that location to the Prime Meridian (E or W). Together, these determine the point of your location. By knowing different coordinates, you can use maps or Global Positioning System (GPS) and Geographic Information System (GIS) technologies to identify any point on the globe.

While maps are useful for finding different points or locations, they are also useful because they provide directions to help you find your way from one point to another. When looking at a map, the first things you should determine are the **cardinal directions** (north, south, east, and west) by looking at the map's **compass rose**. This will help you determine your **orientation** on the map. Next, find the **scale** of the map. This gives you a reference for the actual distance from one map point to another. The scale will be different depending on the type of map you use. Looking at a **legend** will help you determine what the different symbols on a map represent.

Activity Concepts and Vocabulary

- **Cardinal directions:** The cardinal directions are north, south, east, and west. North and south are determined by the position of the North and South Poles. East and west are determined by the earth's rotation.
- **Cartographer** (pronounced kahr-tog-ruh-fer): A person who develops maps.
- **Compass rose:** A circular symbol that is found on a map and indicates the directions of north, south, east, and west.
- **Coordinate** (pronounced koh-awr-dn-it): A set of numbers used to determine the position of a point on a map.
- **Equator:** A horizontal (east-west) line at 0° latitude that divides the earth into equal Northern and Southern Hemispheres.
- **Hemisphere:** One half of a sphere or globe.
- **Intersection:** The point where two lines (longitude and latitude) cross each other on a map.



- **Latitude:** The horizontal lines running left to right on a map, and measuring north-to-south position.
- **Legend:** A table or chart describing the meaning of symbols on a map.
- **Longitude:** The vertical lines running up and down on a map and measuring east-to-west position.
- **Orientation:** The correct relationship to a specific direction with respect to the reference points on a compass.
- **Point:** A point is the intersection of a latitude line and a longitude line.
- **Prime Meridian (Greenwich Meridian):** The vertical (north-south) line at 0° longitude that divides the earth into equal Eastern and Western Hemispheres.
- **Scale:** A reference that designates what distance on a map corresponds to a given distance in the real world (e.g., “|————|= 1 mile”).
- **Sphere:** An object that is a round solid figure; the shape of a globe or planet.

Life Skills

- **Head:** Critical thinking, problem solving, learning to learn, planning/organizing, wise use of resources.
- **Heart:** Communication, cooperation, sharing.
- **Hands:** Contributions to a group effort, teamwork.
- **Health:** Self-discipline, self-esteem.

California Educational Content Standards

- Third Grade:
 - ✓ Investigation and Experimentation – 5c
- Fourth Grade:
 - ✓ Investigation and Experimentation – 6b
- Fifth Grade:
 - ✓ Investigation and Experimentation – 6g
- Sixth Grade:
 - ✓ Investigation and Experimentation – 7f

Subject Links

Science, Math, and Language Arts.

Purpose of Activity

To understand the coordinate system and learn how to use a map by focusing on scaling and directions.

Overview of Activity

This activity is separated into two parts. Part 1 introduces youth to coordinates, latitude, and longitude. Youth will discover the importance of latitude and longitude lines on a map and learn how to use these lines to determine coordinates of a point. Part 2 will address the concepts of scaling and direction. By looking at different maps, youth will learn how to interpret information on a map and will also learn how different types of maps are helpful in different situations. This will link to the use of mapping with GPS technologies. (If you have access to GPS devices for participants to use, try using Module 3B [ANR Publication 3441] instead of this one.)

Time Required

40 to 60 minutes.

Suggested Grouping

Pairs or small groups of 3 to 4.

Materials Needed

(* = *Materials provided in curriculum*)

- * *Simple Map of California* (See appendix)
- * *Detailed Map of California* (See appendix)
- * *Map of United States* (See appendix)
- Rulers
- Pencils, pens, or markers
- Flip chart paper

Getting Ready

- Make enough copies of the *Simple Map of California* so half of the groups can receive a copy.
- Make enough copies of the *Detailed Map of California* so each group has a copy.
- Make enough copies of the *Map of United States* so each group has a copy.
- Make sure you have enough rulers for each group.

- Make sure you have enough flip chart paper and pencils, pens, or markers for each youth.

Opening Questions

1. **If you are trying to describe the specific location of an object in your bedroom (e.g., on a bookshelf, in a drawer) to someone, what do you think are some useful ways to do this?** Please write your responses on the flip chart paper provided.
2. **If your friend is traveling by car or bicycle to a place he or she has never been, describe what he or she might need to know and how you might go about giving him or her directions.** Please write your thoughts and ideas on the flip chart paper provided.
3. **If you were going on a trip to a new place, how might you find out how to get there?** Please write your responses on the flip chart paper provided.
4. **What are some things you know about maps and the information you can find on them?** Please write your responses on the flip chart paper provided.

PART 1: Procedure (Experiencing)

1. Divide the group of youth in half. Within each half, have the youth work in small groups of 3 or 4 individuals.
2. Distribute the *Simple Map of California* to half of the youth; pass out the *Detailed Map of California* to the other half of the group.
3. Have each small group of 3 or 4 describe in as much detail as they can the location of the following cities in relation to each other. Please ask them to write their responses on the flip chart paper provided.
 - ✓ San Francisco and Sacramento
 - ✓ Sacramento and Fresno
 - ✓ Fresno and San Francisco

PART 1: Sharing, Processing, and Generalizing

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations. If necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **Ask the different small groups to share how they described the location of one of the cities in relation to the other.**
2. **Which small group's description do you think is the most useful? Why?**

PART 2A: Procedure (Experiencing)

1. Pass out the *Map of the United States* to each group.
2. Ask the youth to find the major city closest to each of these two points: 123°W, 38°N and 118°W, 34°N.
 - ✓ **Volunteer Tip:** The correct answers are San Francisco and Los Angeles.
3. Noting the scale on the map (usually at the bottom near the legend), have the youth use the rulers to estimate the distance between the two cities.

PART 2A: Sharing, Processing, and Generalizing

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations. If necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **How did you find these points?** Please explain.
2. **What do you know about the horizontal and vertical lines and the points where they cross?**
 - ✓ **Volunteer Tip:** Listen for the terms latitude, longitude, and coordinates.
3. **How did you figure out the distance? What does one inch on this map represent?**

4. **If you were traveling from the first point to the second, in which direction would you be traveling?** Have them explain their method.
 ✓ **Volunteer Tip:** The correct answer is southeast.

PART 2B: Procedure (Experiencing)

1. Pass out copies of the *Detailed Map of California* to each group that previously had the *Simple Map of California*.
2. Have the youth find the same two points/cities on this map (123°W, 38°N and 118°W, 34°N) as on the previous map.
3. Noting the scale on this map, have them again estimate the distance between the two points.

PART 2B: Sharing, Processing, and Generalizing

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations. If necessary, use more targeted questions as prompts to get to particular points. Specific questions might include:

1. **What is different about this map compared to the previous map? Please describe.**
2. **Which map do you think made it easier to use to find the distance between these two cities? Please explain why.**

Concept and Term Introduction

At this point, volunteers need to ensure that the concepts and terms **cardinal directions** (north, south, east, west), **cartographer**, **compass rose**, **coordinate**, **equator**, **intersection**, **latitude**, **longitude**, **orientation**, **point**, **Prime Meridian**, and **scale** have been introduced. (**Note:** The goal is to have the youth develop these concepts through their own exploration and define the terms using their own words.)

Concept Application

1. Record the location of all fairs, shows, and exhibitions you attend with your animal during the year in your record book.
2. Using the *Detailed Map of California* provided in this activity or some other detailed map of California, identify the latitude and longitude of each fair, show, and exhibition you attend with your animal during the year. Record this information in your record book.
3. Using the cardinal directions (north, south, east, and west) as well as the scale on the map, determine the direction and distance each fair, show, or exhibition is from your home. Record this information in your record book.

References

- Answers.com. (2009). Cardinal direction. WikiAnswers.com.
<http://www.answers.com/topic/cardinal-direction>
- Davidson, R. (2002–2008). Reading topographic maps. Geographic coordinates.
<http://www.map-reading.com/ch4-1.php#fig4-4>
- Rosenberg, M. Map scale – Measuring distance on a map. <http://geography.about.com/cs/maps/a/mapscale.htm>
- Tohen, B. (1999-2002). Origins of the compass rose. <http://www.gisnet.com/notebook/comprose.html>
- Wikipedia. Map. <http://en.wikipedia.org/wiki/Maps>

ACTIVITY



Tracking Your Animal's Movement from Fair to Fair

IMPORTANT NOTE: Please note that Activity in Modules 3A and 3B is essentially the same, so you should choose to do one or the other. The only difference between these activities is that Activity in Module 3B is designed to use GPS units to locate fairs and do a traceback. We recommend that you try Activity in Module 3B (publication 8441) if you have GPS units readily available.

Subject Overview and Background Information

4-H Animal Science projects are potential **bio-security** risks. The majority of 4-H Animal Science projects focus on the rearing, husbandry, and, in many cases, showing and marketing of live animals, including poultry, ruminants, and swine. In most cases, 4-H members house their animals at home or in shared facilities, meet collectively as a club once or more every month, and convene in larger groups on exhibition days and at county or state fairs. Because backyard flocks and herds serve as potential vectors of disease, these public venues represent a significant bio-security risk.

Maintaining records of animal movement is critical to helping prevent the spread of disease. If an animal at a fair or show were to be infected with a disease, access to information that accurately describes the animal's movements would be very useful for a step known as a **traceback**. In a traceback, you can see where the animal has traveled and determine which other animals may have been exposed to the disease and may have become infected.

Activity Concepts and Vocabulary

- **Bio-security:** Precautions taken to protect a living thing (e.g., humans, animals, or plants) from attack or interference due to biological organisms that have

the potential to cause them harm. A less formal definition for bio-security is “Keeping the bad bugs off the farm.”

- **Direct contact:** Physical contact between an ill person or animal and a healthy person or animal.
- **Indirect contact:** When an uninfected person or animal touches the contaminated surface of an inanimate object (e.g., a food dish or tabletop) that has previously come into contact with an infected person or animal.
- **Traceback:** The process of tracking the places where an animal has been.

Life Skills

- **Head:** Keeping records, critical thinking, problem solving, decision making.
- **Heart:** Sharing, cooperation, communication.
- **Hands:** Contributions to group effort, teamwork.
- **Health:** Disease prevention, personal safety.

California Educational Content Standards

- Third Grade:
 - ✓ Investigation and Experimentation – 5c, 5e
- Fourth Grade:
 - ✓ Investigation and Experimentation – 6c
- Fifth Grade:
 - ✓ Investigation and Experimentation – 6g, 6h
- Sixth Grade:
 - ✓ Investigation and Experimentation – 7b, 7f

Subject Links

Science and Language Arts.

Purpose of Activity

To understand the importance of assessing and managing the factors that increase the risk of disease transmission, as well as how a good strategy for keeping accurate records can help with your traceback efforts when you need to locate the source and site of infection in the event of a disease outbreak.

Overview of Activity

In this activity, youth will simulate travel to different fairs with project animals. Through this experience, they will develop an understanding of how the act of taking their animals to multiple fairs or shows increases their risk of exposure to disease. They will also understand how important it is for them to keep accurate records to assist in traceback efforts.

Time Required

60 minutes.

Suggested Grouping

5 small groups or pairs.

Materials Needed

(* = Materials provided in curriculum)

- * *Longitude/Latitude Degree Cards* (See appendix)
- * *Coordinates for Homes and Fairs* (See appendix)
- * *Home and Fair Name Labels* (See appendix)
- Something to hold down the labels (rocks, tape etc.)
- Colored paper (8½ x 11 inch sheets of construction paper in blue, purple, green, red, and orange)
- * *Tracking Sheets*
- * *Volunteers: Tracking Sheets Key*
- * *Detailed Map of California*
- * *Animal Contact Record Sheet* (Concept Application)
- Five medium or large plastic cups
- Flip chart paper
- Pencils, pens, or markers
- A clipboard for each group (optional)

Getting Ready

- Copy and cut the *Home and Fair Name Labels* and *Longitude/Latitude Degree Cards*.
- Make enough copies of *Coordinates for Homes and Fairs* sheet so each group has a copy.
- Cut colored construction paper into 16 squares for all five colors, and then crumple the squares to form wads.
- Make enough copies of the *Animal Contact Record Sheet* so each youth has at least one copy of the sheet (Concept Application).
- Make sure you have enough flip chart paper and pencils, pens, or markers for each group.
- Identify a large area (e.g., school playground, gymnasium, multi-purpose room) where youth can construct a map of California. Using the *Longitude/Latitude Degree Cards* (held down by rocks, tape, etc. if necessary) and a copy of the *Detailed Map of California*, construct a large map of California. (**Note:** If possible, the map should be at least the size of a basketball court.) Once the *Longitude/Latitude Degree Cards* have been arranged, place the *Home and Fair Name Labels* at the appropriate points on the large map using the *Coordinates for Homes and Fairs* handout (appendix) and the *Detailed Map of California* as guides.
- Divide the youth into 5 pairs or 5 groups of 2 to 4 youth and designate each group with a color (blue, purple, green, red, and orange).
- Provide each group with a copy of the *Detailed Map of California*.
- Provide each group with *Tracking Sheets*. Each *Tracking Sheet* has a designated color. Provide a copy of the *Tracking Sheet* to each group according to color.

Opening Questions

1. **When considering disease, disease spread, risk assessment, and bio-security, how might these concepts relate to you personally with respect**

to your Animal Science projects? Please write your responses on the flip chart paper provided.

2. **If it were your job to be a health inspector, what information do you believe would be important for you to know in order to monitor or control disease spread?** Please write your responses on the flip chart paper provided.

Procedure (Experiencing)

Once the large map has been created, ask the youth to review their *Tracking Sheets*. Have all participants identify their “home” on the large map, their animal’s identification (the color of their paper wads), the number of rounds, and the number of steps per round. Have them take note of the coordinates that are given to them and the data that are left for them to record (the name of the fair and the other “animals” [colors] present at the fair).

- ✓ **Volunteer Tip:** It is important that the person facilitating this activity keep track of the different rounds and the number of colored pieces of paper that are exchanged between groups throughout the activity.

Round 1

1. Standing near their home city, ask the youth to locate Fair 1 on their *Detailed Map of California* using the coordinates provided on their *Tracking Sheet*.
 - ✓ **Note:** Find the county fair closest to the coordinates provided.
2. Ask the youth to find this fair’s location on the large map and visit it, taking with them their cups full of wads of colored paper.
3. When each group has reached this fair, ask them to exchange wads of colored paper with any other groups at the same fair. They should exchange 1 wad of their colored paper with each group.
4. Ask the youth to fill in the appropriate information on their *Tracking Sheet* and then return home.
5. Once everyone has reached their home, have the Volunteer draw one color at random. Tell the youth that the animals with this color were infected with

a disease that is passed from animal to animal via **direct** or **indirect** contact. Ask the youth to do a traceback using their *Tracking Sheets*. Their goal is to identify where and when their animal (color) came into contact with the infected animal(s).

6. **Discussion:** In addition to the animals that were identified as being sick, were any other animals infected? If so, which animals are they? Where were they infected? Ask the youth to explain. If the animals were not infected, ask the youth to explain why.
7. This is the end of Round 1. Ask each group to remove any wads of paper that are not of their original color and return those to their appropriate groups before they proceed to Round 2.

Round 2

1. Standing near their home city, ask the youth to locate Fair 1 on their *Detailed Map of California* using the coordinates provided on their *Tracking Sheet*.
 - ✓ **Note:** Find the county fair closest to the coordinates provided.
2. Ask the youth to find this fair’s location on the large map and visit it, taking with them their cups full of wads of colored paper.
3. When each group has reached this fair, ask them to exchange wads of colored paper with any other groups at the same fair. They should exchange 3 wads of their colored paper with each group.
4. Ask the youth to fill in the appropriate information on their *Tracking Sheet* and then return home.
5. Next, ask the youth to locate Fair 2 on their *Detailed Map of California* using the coordinates provided on their *Tracking Sheet*.
 - ✓ **Note:** Find the county fair closest to the coordinates provided.
6. Taking with them all of the wads of colored paper they collected from Fair 1 as well as their own colored pieces, ask the youth to locate Fair 2 and visit it.

7. When each group has reached the location of Fair 2, ask them to exchange wads of their own colored paper, plus any other-colored pieces they collected from Fair 1, with other groups at the same fair. They should give each group at that location 1 wad of paper of each color that they have in their cup.
8. Ask the youth to record the appropriate information on their *Tracking Sheet* and return home. Make sure that when they return home they still have colored pieces that they collected from Fair 1 and Fair 2.
9. Announce that the animals with the color ORANGE have been infected with a disease that is passed from animal to animal via **direct** or **indirect** contact. Ask the youth to do a traceback using their *Tracking Sheets*. Their goal is to identify where and when their animal (color) came into contact with infected animals.
10. Using their *Tracking Sheets*, have them return to their last fair. Once they have reached their last fair, have them discuss with other groups at the fair where and when their animal (color) came into contact with the infected animal. If there are no other groups at the fair, the members of the one group there can discuss this among themselves.
11. Starting from their last fair, have them repeat step 10 until they have done a traceback to all the fairs they have visited for this round. They should end at their home.
12. **Discussion:** Have the groups share information about whose animals were infected, where they became infected, and how they got infected. Then have them work as an entire group to brainstorm ideas on different ways their animal could have been infected.
13. This is the end of Round 2. Ask each group to remove any wads of colored paper that are not of their original color and return those to their appropriate groups. Then proceed to Round 3.

Round 3

1. Standing near their home city, ask the youth to locate their Fair 1 on their *Detailed Map of California* using the coordinates provided on their *Tracking Sheet*.

- ✓ **Note:** Find the county fair closest to the coordinates provided.
2. Ask the youth to find this fair's location on the large map and visit it, taking with them their cups full of wads of colored paper.
3. When each group has reached this fair, ask them to exchange wads of colored paper with any other groups at the same fair. They should exchange 5 wads of their colored paper with each group.
4. Ask the youth to fill in the appropriate information on their *Tracking Sheet* and then return home.
5. Ask the youth to take all of the wads of colored paper they collected from Fair 1 as well as their own colored pieces, and then to locate Fair 2 and visit it.
 - ✓ **Note:** Find the county fair closest to the coordinates provided.
6. When each group has reached the location of this fair, ask them to exchange wads of their own colored paper, plus any other-colored pieces they collected from Fair 1 with other groups at the Fair 2. They should give each group 3 wads of paper of each color that they have in their cup.
7. Ask the youth to record the appropriate information on their *Tracking Sheet* and then return home. Make sure that when they return home they still have colored pieces that they collected from Fair 1 and Fair 2.
8. Ask the youth to locate Fair 3 on their *Detailed Map of California* using the coordinates provided.
 - ✓ **Note:** Find the county closest to the coordinates provided.
9. Taking with them their own colored pieces and all of the colors they collected from Fair 1 and Fair 2, ask the youth to locate Fair 3 on the large map and visit it.
10. When each group has reached the fair, ask them to exchange their own colored pieces of paper, plus any other-colored pieces they collected from Fair 1 and Fair 2, with other groups at the same fair. They should give each other 1 wad of each color that they have in their cup.

11. Ask the youth to record the appropriate information on their *Tracking Sheet*, and then return home. Make sure that when they return home they still have colored pieces that they collected from Fair 1, Fair 2, and Fair 3.
12. Announce that animals with the color RED were found to be infected with a disease that is passed from animal to animal via **direct** or **indirect** contact. Ask the youth to do a traceback using their *Tracking Sheets*. Their goal is to identify where and when their animal (color) came into contact with infected animals.
13. Have them return to their last fair using their *Tracking Sheets*. Once they have reached their last fair, have them discuss with other groups at the fair where and when their animal (color) came into contact with the infected animal. If there are no other groups at the fair, the members of the one group there can discuss this among themselves.
14. Starting from their last fair, have them repeat step 13 until they have done a traceback to all the fairs they have visited for this round. They should end at their home.
15. **Discussion:** Have the groups share information about whose animals were infected, where they became infected, and how they got infected. Then as an entire group, brainstorm ideas on different ways their animal could have been infected.
16. This is the end of Round 3. Ask each group to remove any wads of colored paper that are not of their original color and return those to their appropriate groups.

Sharing, Processing, and Generalizing

Follow the lines of thinking developed by the youth as they share and compare their thoughts and observations. If necessary, use more targeted questions as prompts to get to particular points. Specific questions/prompts might include:

1. **Compare the data on the *Tracking Sheets* from Rounds 1, 2, and 3. What do you conclude from**

the information you recorded? Why were more colors present in one round than in another? What do you think the colored pieces of paper represented?

- ✓ **Volunteer Tip:** They represent contacts, direct or indirect, with other animals. Consult *Volunteer's Key* if necessary.
2. **This activity is staged. How might this play out if you and other members were actually transporting your animals to different fairs? Please explain your thoughts and ideas.**

Concept and Term Introduction

At this point, volunteers need to ensure that the concepts and terms **bio-security**, **direct contact**, **indirect contact**, and **traceback** have been introduced. (**Note:** The goal is to have the youth develop these concepts through their exploration and define the terms using their own words.)

Concept Application

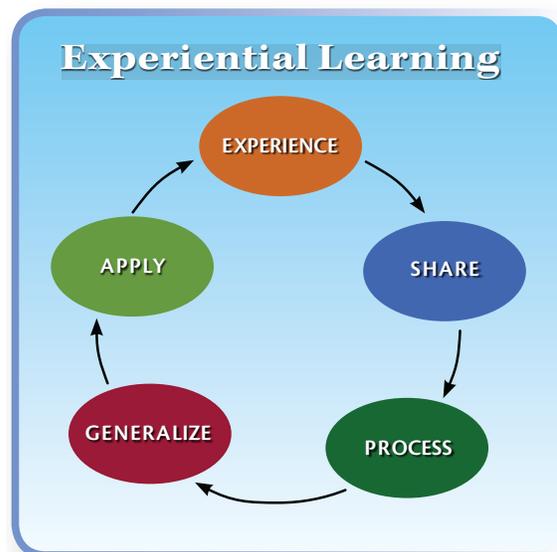
1. Provide the youth with the worksheet *Animal Contact Record Sheet*. This worksheet is to be used at their farm or on their property or at any club meeting, fair, show, or exhibition where the youth might transport and house their animals. Have the youth make observations and complete the worksheet as accurately as possible.
2. Have the youth discuss their completed worksheets and the possible risks to which their project animal may have been exposed. Then discuss different ways to reduce the risks.
 - ✓ **Volunteer Tip:** Have the youth write the risks on flip chart paper or a white board, and then have a group discussion of possible ways to reduce the risk.

References

- Baha'i Computer and Communication Association. Look-up latitude and longitude – USA.
http://www.bcca.org/misc/qiblih/latlong_us.html#CALIFORNIA
- Bailey, DeVonn (2004). Benefits and costs associated with an animal identification system for cattle in the United States. Western Center for Risk Management Education.
<http://ucce.ucdavis.edu/files/filelibrary/1524/24478.pdf>
- California Department of Food and Agriculture. Fairs and expositions.
<http://www.cdfa.ca.gov/fe/>
- The Ohio State University Extension. Bio-security for youth livestock exhibitors.
<http://ohioline.osu.edu/vme-fact/0007.html>
- Wallace, D. (2001). “Bio-security” and “biocontainment” for livestock in 2001. Extension Ag Update, University of Illinois Extension.
http://www.urbanext.uiuc.edu/agupdate/0111_article1.html
- What Is GIS? GIS.com.
<http://www.gis.com/whatisgis/index.html>

APPENDIX

The activities in this curriculum were designed around inquiry and experiential learning. Inquiry is a learner-centered approach in which individuals are problem solvers investigating questions through active engagement, observing and manipulating objects and phenomena, and acquiring or discovering knowledge. Experiential learning (EL) is a foundational educational strategy used in 4-H. In it, the learner has an experience phase of engagement in an activity, a reflection phase in which observations and reactions are shared and discussed, and an application phase in which new knowledge and skills are applied to real-life settings. In 4-H, an EL model that uses a five-step learning cycle is most commonly used. These five steps—Experiencing, Sharing, Processing, Generalizing, and Applying—are part of a recurring process that helps build learner understanding over time.



For more information on inquiry, EL, and the five-step learning cycle, please visit the University of California Science, Technology, and Environmental Literacy Workgroup's Experiential Learning Web site, <http://www.experientiallearning.ucdavis.edu/>.

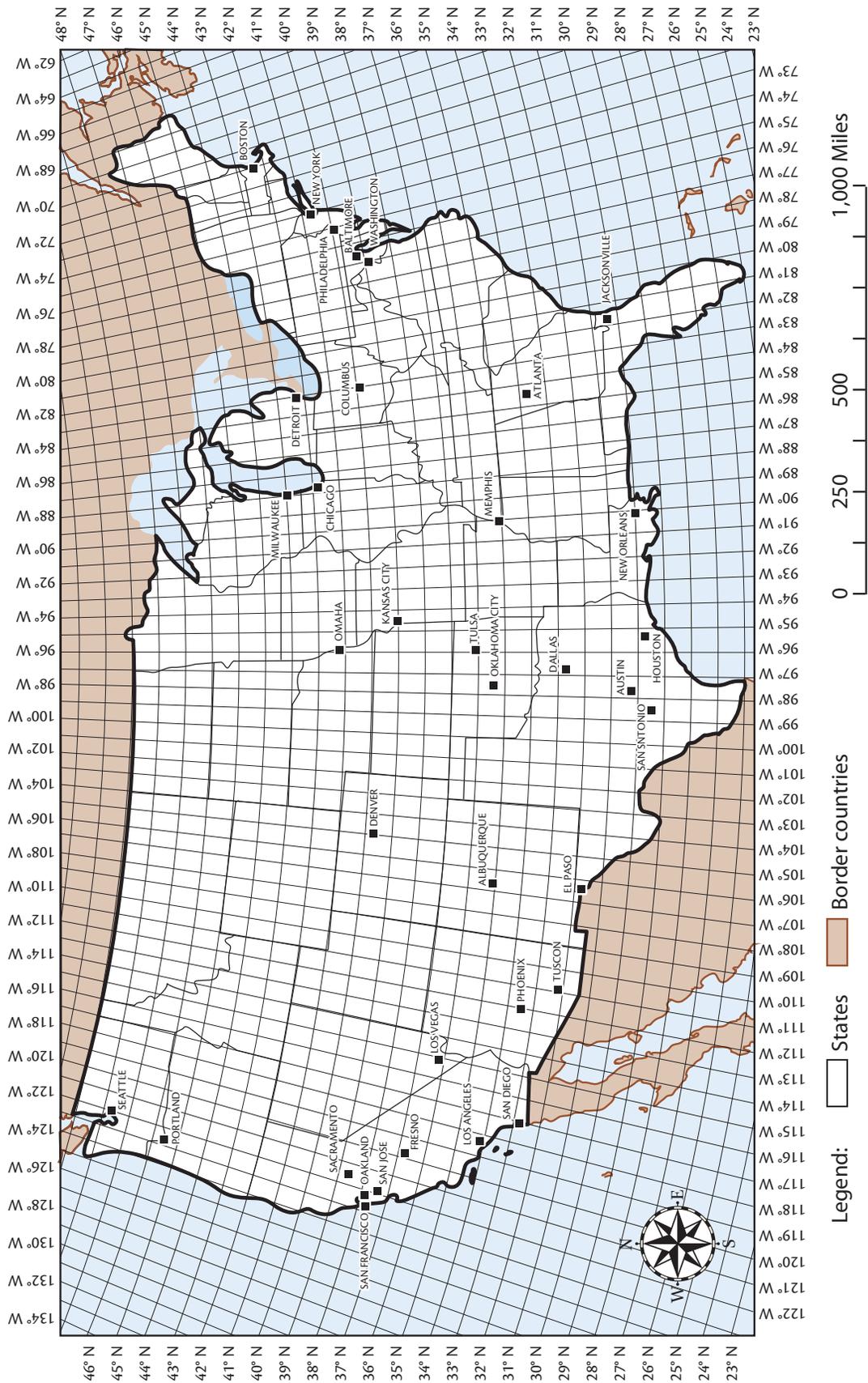
SIMPLE MAP OF CALIFORNIA



DETAILED MAP OF CALIFORNIA



MAP OF UNITED STATES



Longitude/Latitude Degree Cards

124°W



123°W

122°W

121°W

120°W

119°W

118°W

117°W

116°W

115°W

43°N

42°N

41°N

40°N

39°N

38°N

37°N

36°N

35°N

34°N

33°N

32°N

31°N

Coordinates for Homes and Fairs

(Note: These coordinates are approximations.)

| Home | Coordinates |
|-----------------|-----------------------------------|
| Monterey | Latitude: 36° N Longitude: 122° W |
| Sacramento | Latitude: 39° N Longitude: 121° W |
| San Diego | Latitude: 33° N Longitude: 117° W |
| San Luis Obispo | Latitude: 35° N Longitude: 121° W |
| Santa Cruz | Latitude: 37° N Longitude: 122° W |

| Fair | Coordinates |
|--|-----------------------------------|
| Amador County Fair | Latitude: 38° N Longitude: 121° W |
| Butte County Fair | Latitude: 40° N Longitude: 122° W |
| El Dorado County Fair | Latitude: 39° N Longitude: 120° W |
| Fresno County Fair | Latitude: 36° N Longitude: 119° W |
| Los Angeles County Fair | Latitude: 34° N Longitude: 119° W |
| Merced County Fair | Latitude: 37° N Longitude: 121° W |
| San Bernardino County Fair | Latitude: 35° N Longitude: 116° W |
| San Diego County Fair | Latitude: 33° N Longitude: 117° W |
| Santa Barbara County Fair and Exposition | Latitude: 35° N Longitude: 120° W |
| Sonoma-Marín County Fair | Latitude: 38° N Longitude: 123° W |
| Tehama District Fair | Latitude: 40° N Longitude: 123° W |
| Yuba-Sutter Fair | Latitude: 39° N Longitude: 121° W |

Home Name Labels

Monterey



Sacramento

San Diego

San Luis Obispo

Santa Cruz

Fair Name Labels

Merced County Fair

Fresno County Fair

Santa Barbara County
Fair and Exposition

San Bernardino
County Fair

Fair Name Labels

Los Angeles County
Fair

Yuba-Sutter Fair

Sonoma-Marin
County Fair

El Dorado County
Fair

Fair Name Labels

Amador County Fair

Butte County Fair

San Diego County Fair

Tehama District Fair

BLUE Tracking Sheet

Home: San Diego

- **Color:** Blue
- **Latitude:** 33° N
- **Longitude:** 117° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|---------------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1: San Bernardino County Fair | 35° N | 116° W | 7/20/05 | | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|---------------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1: San Bernardino County Fair | 35° N | 116° W | 7/25/06 | | 3 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/02/06 | | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | | 1 wad of paper of each color to each group at the fair |

GREEN Tracking Sheet

Home: San Louis Obispo

- **Color:** Green
- **Latitude:** 35° N
- **Longitude:** 121° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|-------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1: Fresno County Fair | 36° N | 119° W | 7/20/05 | | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/25/06 | | 3 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/02/06 | | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|---|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 8/05/07 | | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | | 1 wad of paper of each color to each group at the fair |

ORANGE Tracking Sheet

Home: Monterey

- **Color:** Orange
- **Latitude:** 36° N
- **Longitude:** 122° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Merced County Fair | 37° N | 121° W | 7/20/05 | | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/25/06 | | 3 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/02/06 | | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | | 1 wad of paper of each color to each group at the fair |

PURPLE Tracking Sheet

Home: Sacramento

- **Color:** Purple
- **Latitude:** 39° N
- **Longitude:** 121° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|----------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/20/05 | | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/20/05 | | 3 wads of paper to each group at the fair |
| FAIR 2 Merced County Fair | 37° N | 121° W | 8/02/06 | | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | | 5 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | | 1 wad of paper of each color to each group at the fair |

RED Tracking Sheet

Home: Santa Cruz

- **Color:** Red
- **Latitude:** 37° N
- **Longitude:** 122° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/20/05 | | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/25/06 | | 3 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/02/06 | | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|---|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 8/05/07 | | 5 wads of paper to each group at the fair |
| FAIR 2 Stay Home | | | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 Yuba-Sutter Fair | 39° N | 121° W | 8/25/07 | | 1 wad of paper of each color to each group at the fair |

VOLUNTEERS: BLUE Tracking Sheet KEY

Home: San Diego

- **Color:** Blue
- **Latitude:** 33° N
- **Longitude:** 117° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 San Bernardino County Fair | 35° N | 116° W | 7/20/05 | none | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 San Bernardino County Fair | 35° N | 116° W | 7/25/06 | none | 3 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/02/06 | green | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | purple, orange | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | green, orange | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | orange, purple, green | 1 wad of paper of each color to each group at the fair |

VOLUNTEERS: GREEN Tracking Sheet KEY

Home: San Louis Obispo

- **Color:** Green
- **Latitude:** 35° N
- **Longitude:** 121° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Fresno County Fair | 36° N | 119° W | 7/20/05 | none | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/25/06 | orange | 3 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/02/06 | blue | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|---|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 8/05/07 | red | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | blue, orange | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | purple, orange, blue | 1 wad of paper of each color to each group at the fair |

VOLUNTEERS: ORANGE Tracking Sheet KEY

Home: Monterey

- **Color:** Orange
- **Latitude:** 36° N
- **Longitude:** 122° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Merced County Fair | 37° N | 121° W | 7/20/05 | none | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/25/06 | green | 3 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/02/06 | red | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | purple, blue | 5 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/17/07 | green, blue | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | blue, green, purple | 1 wad of paper of each color to each group at the fair |

VOLUNTEERS: PURPLE Tracking Sheet KEY

Home: Sacramento

- **Color:** Purple
- **Latitude:** 39° N
- **Longitude:** 121° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|----------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/20/05 | none | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/20/05 | red | 3 wads of paper to each group at the fair |
| FAIR 2 Merced County Fair | 37° N | 121° W | 8/02/06 | none | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--------------------------------------|----------|-----------|---------|--------------------------|---|
| FAIR 1 Merced County Fair | 37° N | 121° W | 8/05/07 | orange, blue | 5 wads of paper to each group at the fair |
| FAIR 2 Los Angeles County Fair | 34° N | 119° W | 8/17/07 | none | 3 wads of paper of each color to each group at the fair |
| FAIR 3 San Bernardino County Fair | 35° N | 116° W | 8/25/07 | blue, green, orange | 1 wad of paper of each color to each group at the fair |

VOLUNTEERS: RED Tracking Sheet KEY

Home: Santa Cruz

- Color: Red
- Latitude: 37° N
- Longitude: 122° W

Round 1

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|--|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 7/20/05 | none | 1 wad of paper to each group at the fair |

Round 2

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|------------------------------|----------|-----------|---------|--------------------------|--|
| FAIR 1 Yuba-Sutter Fair | 39° N | 121° W | 7/25/06 | purple | 3 wads of paper to each group at the fair |
| FAIR 2 Fresno County Fair | 36° N | 119° W | 8/02/06 | orange | 1 wad of paper of each color to each group at the fair |

Round 3

| Name of the Fair | Latitude | Longitude | Date | Animals (colors) present | Wads of paper exchanged |
|--|----------|-----------|---------|--------------------------|---|
| FAIR 1 Santa Barbara County Fair and Exposition | 35° N | 120° W | 8/05/07 | green | 5 wads of paper to each group at the fair |
| FAIR 2 Stay Homer | | | 8/17/07 | | 3 wads of paper of each color to each group at the fair |
| FAIR 3 Yuba-Sutter Fair | 39° N | 121° W | 8/25/07 | none | 1 wad of paper of each color to each group at the fair |

Animal Contact Record Sheet

Animal: _____

Location of potential contacts (check all that apply):

- | | |
|--|--|
| <input type="checkbox"/> Home _____ | <input type="checkbox"/> Fair: _____ |
| <input type="checkbox"/> Show: _____ | <input type="checkbox"/> Exhibition: _____ |
| <input type="checkbox"/> Direct contact with other animals? __ Yes __ No | |

If yes, contact during:

- | | |
|---|-------------------|
| <input type="checkbox"/> Transportation | |
| Animal species | Number of animals |
| a. _____ | a. _____ |
| b. _____ | b. _____ |
| c. _____ | c. _____ |
| d. _____ | d. _____ |

If yes, contact during:

- | | |
|----------------------------------|-------------------|
| <input type="checkbox"/> Housing | |
| Animal species | Number of animals |
| a. _____ | a. _____ |
| b. _____ | b. _____ |
| c. _____ | c. _____ |
| d. _____ | d. _____ |

If yes, contact during:

- | | |
|--------------------------------------|-------------------|
| <input type="checkbox"/> Competition | |
| Animal species | Number of animals |
| a. _____ | a. _____ |
| b. _____ | b. _____ |
| c. _____ | c. _____ |
| d. _____ | d. _____ |

If yes, contact during:

- | | |
|--|-------------------|
| <input type="checkbox"/> Other (please indicate) _____ | |
| Animal species | Number of animals |
| a. _____ | a. _____ |
| b. _____ | b. _____ |
| c. _____ | c. _____ |
| d. _____ | d. _____ |

- Indirect contact with other animals: __ Yes __ No

If yes, check all that apply:

- | | |
|---|--|
| <input type="checkbox"/> Non-owner human contact | <input type="checkbox"/> Shared food and water |
| <input type="checkbox"/> Troughs/containers | <input type="checkbox"/> Clothing |
| <input type="checkbox"/> Footwear | <input type="checkbox"/> Tools/equipment |
| <input type="checkbox"/> Wash rack | <input type="checkbox"/> Vehicles |
| <input type="checkbox"/> Show arena or exercise area | <input type="checkbox"/> Barn or holding pen |
| <input type="checkbox"/> Other (please specify) _____ | |

For More Information

You will find related information in other publications, slide sets, CD-ROMs, and videos from UC ANR.

To order products or download free publications, visit our online catalog at <http://anrcatalog.ucdavis.edu>. You can also place orders by mail, phone, or FAX, or request a printed catalog of publications, slide sets, CD-ROMs, and videos from

University of California
Agriculture and Natural Resources
Communication Services
1301 S. 46th Street
Building 478 – MC 3580
Richmond, California 94604-3427

Telephone: (800) 994-8849 or (510) 665-2195, FAX: (510) 655-3427
e-mail inquiries: danrcs@ucdavis.edu

An electronic version of this publication is available on the ANR Communication Services website at <http://anrcatalog.ucdavis.edu>.

Publication 8440

ISBN-13: 978-1-60107-694-6



This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by the ANR Associate Editor for Animal, Avian, and Veterinary Sciences.

© 2011 by The Regents of the University of California
Agriculture and Natural Resources.
All rights reserved.

The University of California prohibits discrimination or harassment of any person on the basis of race, color, national origin, religion, sex, gender identity, pregnancy (including childbirth), and medical conditions related to pregnancy or childbirth, physical or mental disability, medical condition (cancer-related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994: service in the uniformed services includes membership, application for membership, performance of service, application for service, or obligation for service in the uniformed services) in any of its programs or activities.

University policy also prohibits reprisal or retaliation against any person in any of its programs or activities for making a complaint of discrimination or sexual harassment or for using or participating in the investigation or resolution process of any such complaint.

University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Equal Opportunity Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6th Floor, Oakland, CA 94607, (510) 987-0096. **For information about obtaining this publication, call (800) 994-8849. For downloading information, call (530) 754-3927.**

To simplify information, trade names of products have been used. No endorsement of named or illustrated products is intended, nor is criticism implied of similar products that are not mentioned or illustrated.

web-4/11-WJC/WFS