

BIO-SECURITY in 4-H Animal Science

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

3B



Maps, GPS, 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**.

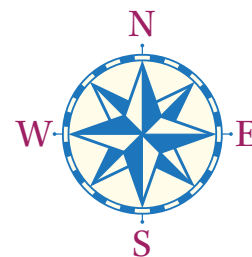
The earth is a **sphere**, and **cartographers** divide its area into 360 degrees (360°) of longitude, running 180° to the west and 180° to the east from the Prime Meridian (0° longitude). North-south measurements begin with 0° latitude at the equator and go up to 90° north at the North Pole and down 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 direction 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 do not have access to GPS devices for participants to use, try using Module 3A [ANR Publication 3440] 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. **Have the different small groups share how they described the location of the cities in relation to the other.**
2. **Which 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>
- Toen, B. (1999-2002). Origins of the compass rose.
<http://www.gisnet.com/notebook/comprose.html>
- Wikipedia. Map.
<http://en.wikipedia.org/wiki/Maps>

ACTIVITY (GPS)



Tracking Your Animal's Movement from Fair to Fair with GPS

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 (this publication) if you have GPS units readily available.

Note: If you want to review your GPS skills beforehand, try the *GPS Practice Activity: Find This!* on page 13.

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.

One way to track animal movement is through **Global Positioning System (GPS)** technology. By picking up signals from satellites that are in orbit around the earth, a GPS unit can tell you the location, traveling speed, time, and direction of an object (e.g., a person, animal, or vehicle). A good understanding of the principles of GPS and the basics of how to use a GPS unit can be very useful in tracking the movement of animals. The data produced by the GPS unit can be input into a **Geographical Information System (GIS)** database. GIS is computer

software that displays geographical information for easy viewing and analysis. An animal owner can use GIS to show where an animal's movements have taken it. If that animal were to be infected with a disease, access to this kind of data on 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.
- **Geographical Information System (GIS):** Computer software that displays geographical information for easy viewing and analysis.
- **Global Positioning System (GPS):** A navigational system that uses signals from satellites orbiting the earth to determine the position of an object.
- **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* (See appendix)
- * *Volunteers: Tracking Sheets Key* (See appendix)
- * *Detailed Map of California* (See appendix)
- * *Animal Contact Record Sheet* (Concept Application) (See appendix)
- * *Basics on GPS* (See appendix)
- Five medium or large plastic cups
- GPS tracking device
- 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 *Basics on GPS* for each group.
- Make enough copies of the *Animal Contact Record Sheet* so each youth has at least one copy of the sheet (Concept Application).
- 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.

- Make sure you have enough flip chart paper and pencils, pens, or markers for each group.
- 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.
- Provide each group with a GPS tracking device

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.

IMPORTANT NOTE: For youth who are unfamiliar with the use of GPS units, please have them read and review *Basics on GPS* (see appendix) BEFORE they continue to the Procedure (Experiencing), below.

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 the 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 each mark their home and enter in HOME in their GPS unit.
2. Ask the youth to look at their *Tracking Sheet (with GPS)* and find their first fair.
3. Then ask the youth to locate this fair on the large map. Have them walk to their first fair, each one taking along their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
4. When each group has reached its first fair, ask the groups to mark the location of the fair and enter the fair’s name into their GPS unit.
5. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 1 wad of their colored paper.
6. Ask the youth to fill in the information on their *Tracking Sheet*.
7. Have them return home using the GPS unit. (**Note:** GPS units are not accurate enough to reliably show separate locations in a confined area, so the goal in this step of the exercise is to get close to home.) Once they have reached their home, have them select “Stop Navigation.”
8. 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 GPS unit. Their goal is to

identify where and when their animal (color) came into contact with the infected animal(s).

9. Using their GPS unit for practice, they should find the fair they went to and use the GPS compass page or map page to try to get back to the fair.
10. Once they have reached the fair, have them discuss with other groups at the fair where and when their animal (color) came into contact with the infected animal(s). If there are no other groups at the fair, have the one group discuss this among themselves.
11. **Discussion:** Ask the youth (all groups) if they were able to use their GPS units to trace back to their last fair. If they had any difficulty with this task, have each group share their difficulties among themselves and then brainstorm ideas as a group on how to make the task easier. In addition to the animals that were identified as being sick, were any other animals infected? If so, which animals, and where were they infected? Have the youth explain their answers. If those animals were not infected, ask the youth to explain why not.
12. This is the end of Round 1. Ask each group to check their cups and remove any colored wads of paper that are not of their original color and to return those to their appropriate groups before they proceed to Round 2.
13. Reset all of the GPS units by deleting the waypoints.

Round 2

1. Standing near their home city, ask the youth to each mark their home and enter HOME in their GPS unit.
2. Ask the youth to look at their *Tracking Sheet (with GPS)* and find their first fair.
3. Then ask the youth to locate this fair on the large map. Have them walk to their first fair, each one taking with them their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
4. When each group has reached its first fair, ask the groups to mark the location of the fair and enter the fair name into their GPS unit.
5. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 3 wads of paper of each color that they have in their cup.
6. Ask the youth to fill in the information for that fair on their *Tracking Sheet*.
7. Once they are done filling in their *Tracking Sheet*, have them return home. (**Note:** Youth can either use the GPS unit to return home or just walk back to their home label.)
8. Next, ask the youth to look at their *Tracking Sheet (with GPS)* and find their second fair.
9. Then ask the youth to locate this fair on the large map. Have them walk to their second fair, each one taking with them their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
10. When each group has reached its second fair, ask the groups to mark the location of the fair and enter the fair's name into their GPS unit.
11. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 1 wad of each color that they have in their cup.
12. Ask the youth to fill in the information for that fair 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.
13. 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 GPS unit. Their goal is to identify where and when their animal (color) came into contact with the infected animal(s).
14. Using their GPS unit for practice, have them find the last fair they went to, and then, using the GPS compass page or map page, have them try to get back to their last fair.
15. Now have them return to their last fair using the GPS unit instead. (**Note:** The GPS units are not entirely accurate on such a small scale, so the actual goal is

to get close to the fair.) When they have reached their last fair, have them select “Stop Navigation.”

16. Now that they have reached their last fair, have them talk with other groups at the fair about where and when their animal (color) may have come into contact with the infected animal(s). If there are no other groups at the fair, youth in the one group there can discuss this among themselves.
17. Next, starting from the last fair where they were, have them repeat steps 15 and 16 until they have done a traceback to all of the fairs they visited for this round. The final step in their traceback should be their home. (**Note:** Once the youth are comfortable with finding a waypoint with their GPS unit, they can skip the GPS step and just walk to their last fair.)
18. **Discussion:** Ask the entire group if they were able to use their GPS units to traceback to all of their fairs. If any youth had any difficulty with this task, have them tell about their difficulties and then let the entire group brainstorm ideas on how to make the task easier. Then have the individual groups tell whose animals from among their group got infected, where they got infected, and how they got infected. Then as an entire group, have the youth brainstorm ideas on different ways their animals could have gotten infected.
19. This is the end of Round 2. Ask each group to check their cups and remove any wads of colored paper that are not of their original color and to return those to their appropriate groups before they proceed to Round 3.
20. Reset all of the GPS units by deleting the waypoints.

Round 3

1. Standing near their home city, ask the youth to each mark their home and enter HOME in their GPS unit.
2. Ask the youth to look at their *Tracking Sheet (with GPS)* and find their first fair.
3. Then ask the youth to locate this fair on the large map. Have them walk to their first fair, each one taking with them their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
4. When each group has reached its first fair, ask the groups to mark the location of the fair and enter the fair's name into their GPS unit.
5. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 5 wads of paper of each color that they have in their cup.
6. Ask the youth to fill in the information for that fair on their *Tracking Sheet*.
7. Once they are done filling in their *Tracking Sheet*, have them return home.
8. Next, ask the youth to look at their *Tracking Sheet (with GPS)* and find their second fair.
9. Then ask the youth to locate this fair on the large map. Have them walk to their second fair, each one taking with them their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
10. When each group has reached its second fair, ask the groups to mark the location of the fair and enter the fair's name into their GPS unit.
11. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 3 wads of paper of each color that they have in their cup.
12. Ask the youth to fill in the information for that fair 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.
13. Next, ask the youth to look at their *Tracking Sheet (with GPS)* and find their third fair.
14. Then ask the youth to locate this fair on the large map. Have them walk to their third fair, each one taking with them their GPS tracking device, *Tracking Sheet*, and cup filled with wads of colored paper.
15. When each group has reached its third fair, ask the groups to mark the location of the fair and enter the fair's name into their GPS unit.
16. Then ask them to exchange their wads of colored paper with any or all other groups at the same fair. They should give each other group 1 wad of paper of each color that they have in their cup.

17. Ask the youth to fill in the information for that fair on their *Tracking Sheet* and then return home. Make sure that when they return home they still have colored pieces they collected from Fair 1, Fair 2, and Fair 3.
18. Announce that the animals with the color RED 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 GPS unit. Their goal is to identify where and when their animal (color) came into contact with the infected animal(s).
19. Now have them return to their last fair using the GPS unit. (**Note:** The GPS units are not entirely accurate on such a small scale, so the goal is to get close to the fair). When they have reached their last fair, have them select “Stop Navigation.” (**Note:** Once the youth are comfortable with finding a waypoint with their GPS unit, they can skip the GPS step and just walk to their last fair.)
20. 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(s). If there are no other groups at the fair, youth in the one group there can discuss this among themselves.
21. Next, starting from the last fair where they were, have them repeat steps 19 and 20 until they have done a traceback to all the fairs they visited for this round. The final step in their traceback should be their home. (**Note:** If the youth are comfortable with finding a waypoint with their GPS unit, they can just walk to their last fair.)
22. **Discussion:** Ask the entire group if they were able to use their GPS units to traceback to all of their fairs. If any youth had any difficulty with this task, have them tell about their difficulties and then let the entire group brainstorm ideas on how to make the task easier. Then have the individual groups tell whose animals in their group got infected, where they got infected, and how they got infected. Then as an entire group, have the youth brainstorm ideas on different ways their animals could have gotten infected.

23. This is the end of Round 3. Ask each group to check their cups and remove any wads of colored paper that are not of their original color and return those to their appropriate groups.
24. Reset all of the GPS units by deleting the waypoints.

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. **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**, **Global Positioning System**, 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/>
- Garmin. (2005). eTrexLegend personal navigator owner's manual and reference guide. Olathe, KS: Garmin International, Inc.
- Garmin. What is GPS?
<http://www8.garmin.com/aboutGPS/>
- How Stuff Works. How GPS receivers work.
<http://www.howstuffworks.com/gps1.htm>
- The Ohio State University Extension. Bio-security for youth livestock exhibitors.
<http://ohioline.osu.edu/vme-fact/0007.html>
- Tuxen, Karin, and Maggi Kelly. 2007. Introduction to Global Positioning Systems (GPS) exercise. Geospatial Imaging and Informatics Facility, UC Berkeley.
- Wallace, D. (2001). "Bio-security" and "bio-containment" 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>



GPS PRACTICE ACTIVITY: FIND THIS!

Time Required

45 to 60 minutes.

Suggested Grouping

Small groups of 3 to 5 youth.

Materials Needed

(* = *Materials provided in curriculum*)

- * *Basics on GPS (See appendix)*
- GPS units
- Small objects (i.e., paper clips, rubber bands, beads, etc.)

Getting Ready

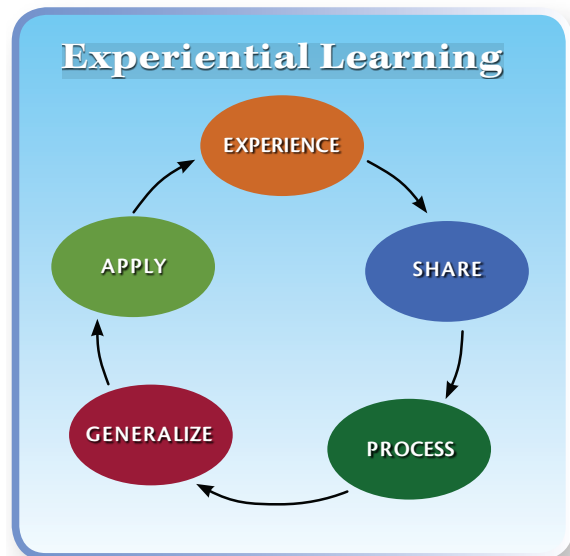
- Divide the group into small groups.
- Make sure there are enough GPS units for each group.
- Make sure there are enough small objects for each group to find.
- Make sure that each group takes a *Basics on GPS* worksheet.

Procedure (Experiencing)

1. Give each group a GPS unit and a small object.
2. Taking the GPS unit with them, have each group hide their small object.
3. Have them mark the point where they hid the object.
4. Have them create a unique name for the waypoint they just marked.
 - ✓ **Note:** Remind them not to use the object's name as a name for the waypoint.
5. Once each group has completed step 4, gather together as one big group.
6. Have the groups trade GPS units with each other. Make sure you remember which group switched with which.
7. Now the goal is for each group to find another group's object. They can use the Navigation Page and Map Page to help them find the object.
8. Once a group has found their object, have them select "Stop Navigation."
9. The group can then pick up the found object and go back to the main group.
10. Once every group has found an object, check to make sure each has the correct object.
11. Delete the waypoints from each GPS unit.
 - ✓ **Note:** If you have any trouble with any of these steps, please refer to the worksheet *Basics on GPS*.

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 Application—are part of a recurring process that helps build learner understanding over time.

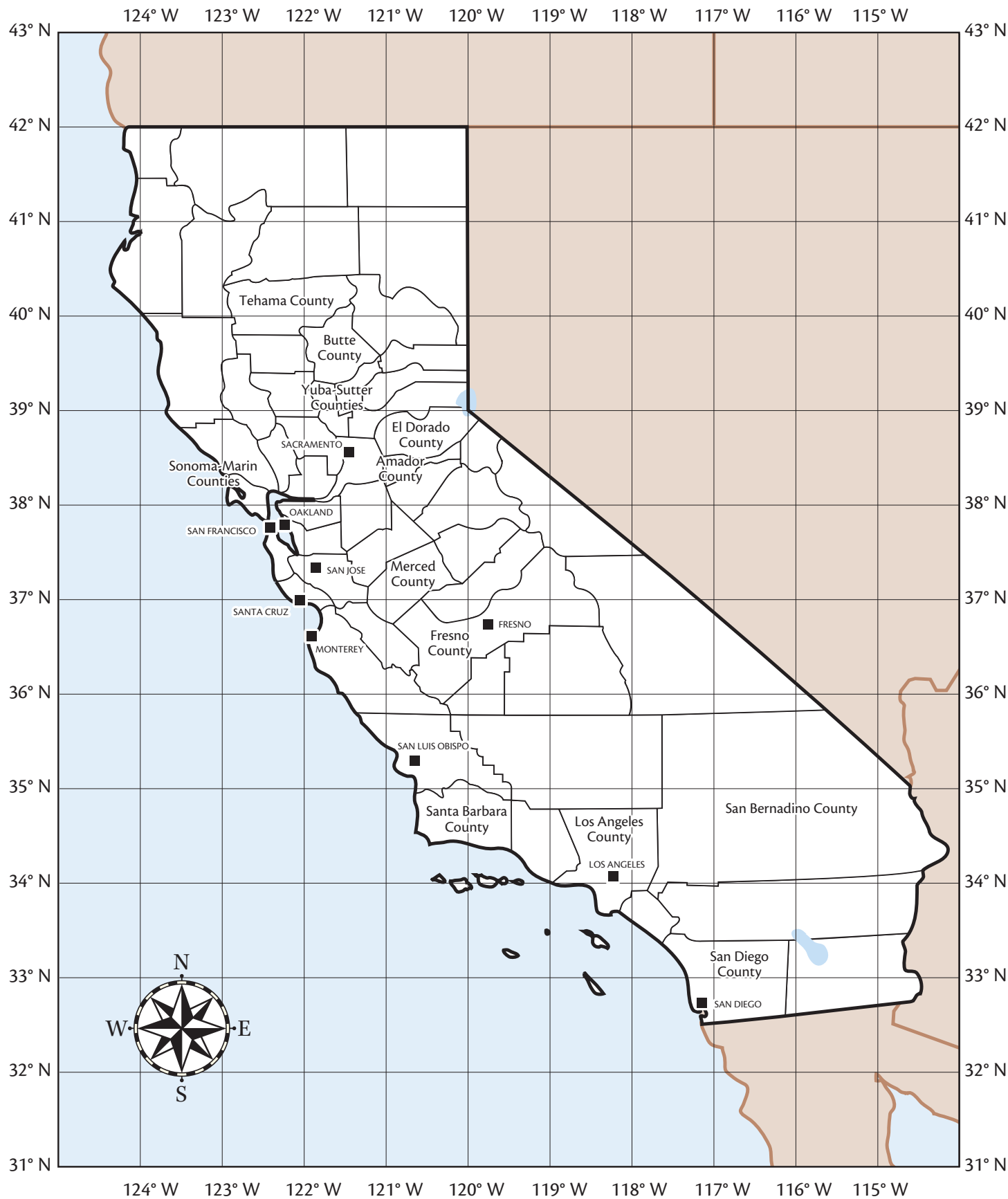


For more information on inquiry, EL, and the five-step learning cycle, please visit the University of California Science, Technology, and Environmental Literacy Workgroup's Experiential Learning Web site, <http://www.experientiallearning.ucdavis.edu/>.

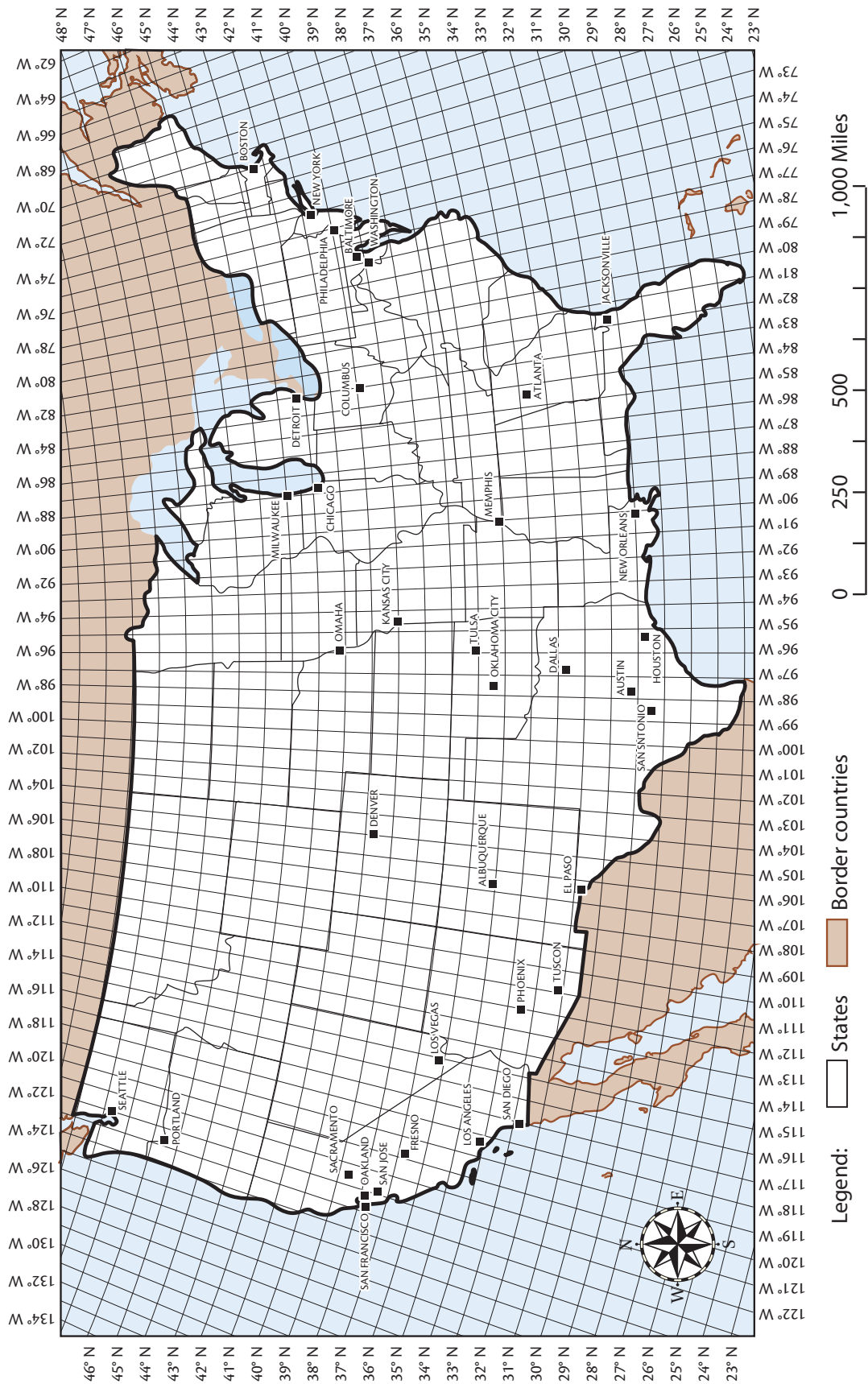
SIMPLE MAP OF CALIFORNIA



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):

- Home _____ Fair: _____
- Show: _____ Exhibition: _____
- Direct contact with other animals? __ Yes __ No

If yes, contact during:

- Transportation

Animal species

Number of animals

- a. _____
- b. _____
- c. _____
- d. _____

- a. _____
- b. _____
- c. _____
- d. _____

If yes, contact during:

- Housing

Animal species

Number of animals

- a. _____
- b. _____
- c. _____
- d. _____

- a. _____
- b. _____
- c. _____
- d. _____

If yes, contact during:

- Competition

Animal species

Number of animals

- a. _____
- b. _____
- c. _____
- d. _____

- a. _____
- b. _____
- c. _____
- d. _____

If yes, contact during:

- Other (please indicate) _____

Animal species

Number of animals

- a. _____
- b. _____
- c. _____
- d. _____

- a. _____
- b. _____
- c. _____
- d. _____

- Indirect contact with other animals: __ Yes __ No

If yes, check all that apply:

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

Basics on GPS

How to use a GPS unit (for Garmin eTrexLegend only)

GPS Button Functions

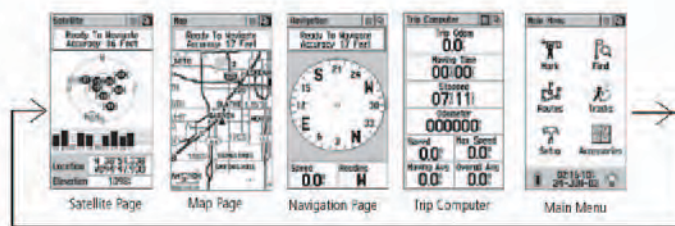
Turning on the GPS Unit

1. Press and hold the **POWER** button, located on the right side on the unit. It is the second button with a light bulb.
2. The first screen you will see is the **Satellite Page**. Be patient! It may take a couple of minutes for your unit to locate the satellites, and you must have at least 4 active satellites before you use the unit. Look for four dark bars at the bottom of the screen. Also, the unit will also display the message "Ready to Navigate." Now you can use the GPS unit.

Main Pages

The GPS unit has five main pages:

1. **Satellite Page:** Provides information on the satellites.
2. **Map Page:** Shows where you move.
3. **Navigation Page:** Provides a compass to help guide you to where you want to go.
4. **Trip Computer:** Provides trip and navigation data.



5. **Main Menu:** Provides additional features and settings.
 You can navigate between these pages by pressing the **PAGE BUTTON** (the top button on the right side of the unit).
 All five main pages show the **Option Menu** and **Main Page Menu**. They are small icons in the upper right-hand corner of each screen. Use the **THUMB STICK** on the front of the unit to choose either the **Option Menu** (left icon) or the **Main Page Menu** (right icon).
 1. **Option Menu:** Provides additional features that allow you to customize the unit.
 2. **Main Page Menu:** This allows you to directly go to a Main Page of your choice.
 To exit either of these menus, move the **THUMB STICK** either left or right.

The ZOOM IN and OUT buttons:

- When on the Map Page, press to Zoom in and out.
- When on the Satellite Page, press to adjust the screen contrast.

The FIND button:

- Press to access the Find Menu.

The THUMB STICK:
(When moved or pressed in, button 'clicks')

- Press to enter highlighted options or confirm messages.
- Move Up/Down or Right/Left to move through lists, highlight fields, on-screen buttons, icons, enter data or move the map panning arrow.
- Press in and hold for two seconds to mark your current location as a waypoint.

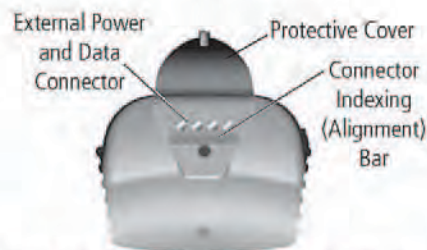


The PAGE button:

- Press to cycle through main pages.

The POWER button:

- Press and hold to turn the unit On/Off.
- Press to toggle the backlighting On/Off.



NOTE: While designed to be held and operated in the left hand, the unit can be used with the right hand, if preferred.

Mark and Name a Waypoint

3. A *waypoint* is a specific geographical location defined by its latitude and longitude and is used for navigational purposes.
4. When you are at a desired location (e.g., a treasure you buried in your backyard) and you want to mark it as a new waypoint, press and hold the **THUMB STICK** (located on the front of the unit). (Note: The coordinates of the point you are marking will appear at the bottom of the **Satellite Page** and the **Waypoint Page**.) You can always mark a point, regardless of which screen you are using.
5. When you press the **THUMB STICK** to mark your desired point, the **Waypoint Page** will appear. Name your waypoint by moving the **THUMB STICK** up to highlight the number that appears on the flag. Push down on the **THUMB STICK** and a keyboard will appear; select the numbers or letters you want to name your waypoint and then click **OK**. Your waypoint is now marked and labeled; you will automatically return to the **Waypoint Page**.
6. Now click **OK** at the bottom of the **Waypoint Page** to exit.

Return to a Waypoint

1. Press the **FIND** button located on left side of the unit. There is a picture of a big magnifying glass below it.
2. Highlight and click “**Waypoints**” using the **THUMB STICK**.
3. Select and click “**By Name**.” A list of waypoints will appear.
4. Scroll down to the waypoint you want to find. Select and click that waypoint. The **Waypoint Page** for that specific point will now be displayed.
5. Select and click the **GOTO** button. This will send you to the **Navigation Page**, which will direct you to the waypoint. All you have to do is follow the arrow. (**Hint:** Walk slowly. The arrow might point to a building, but watch the distance to the point!)
6. You can also use the **Map Page** (remember: You get there by pushing the **PAGE BUTTON** [top right side of

the unit] to help you navigate to your waypoint). This screen shows you your position, the waypoint you want to go to, and a line showing the shortest path.

7. **Hint:** It may or may not be possible to take the shortest path, due to buildings!
8. **Another Hint:** The **ZOOM IN** and **ZOOM OUT** buttons are located on the left side of the unit. They may be helpful if you are using the **Map Page**.
9. You can move between the **Map Page** and **Navigation Page** to help return you to the point of interest. This is accomplished by using either the **PAGE BUTTON** or the **Main Page Menu**.

Stop Navigation

1. Once you have reached your last destination, select and click the **Options Menu** and then select and click “**Stop Navigation**.” This will end your navigation to your selected waypoint. Now you can look for another waypoint.

Deleting Waypoints

2. Press the **FIND** button located on left side of the unit (with a big magnifying glass nearby).
3. Highlight and click “**Waypoints**.”
4. Select and click “**By Name**.” A list of waypoints will appear.
5. Click the **Options Menu** and select and click “**Delete All**.”
6. “Do you really want to delete all waypoints?” will appear on the screen. Select and click “**Yes**.”

A Few Important Notes:

- For those GPS units without an electronic compass, your direction of travel will only be updated if you are moving.
- Depending on your GPS unit model, the accuracy/offset/error may not appear on the same page as the **Satellite Page**. You may have to look elsewhere on the unit to view and record its accuracy!

- If your unit's accuracy is not precise enough or is inconsistent, wait a minute or so, or move around a bit in the general area of where your point is. If this yields no adequate improvement, you may have to either (a) calibrate your unit's compass, (b) replace your unit's batteries, or (c) go to a place nearby with less signal interference and thus greater accuracy.

For More Information

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

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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

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