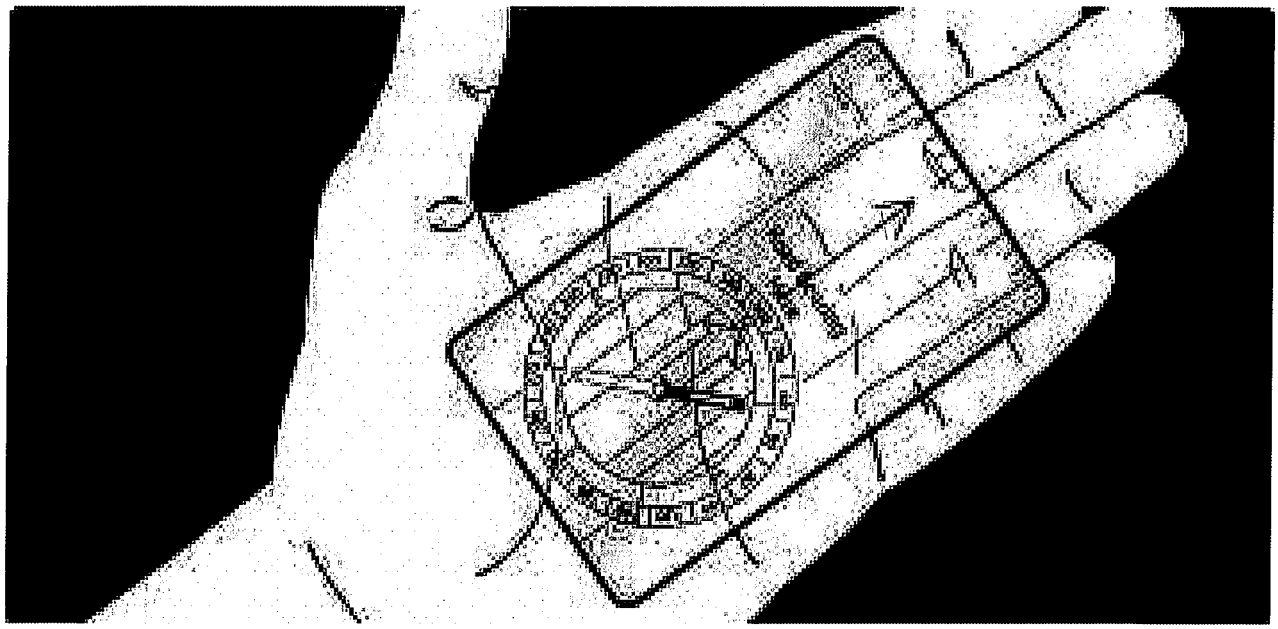
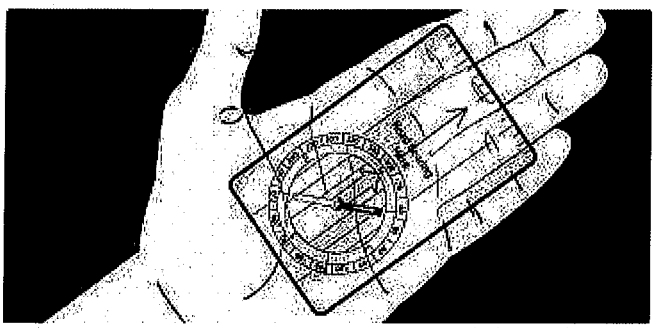
UC
CE

Orienteering





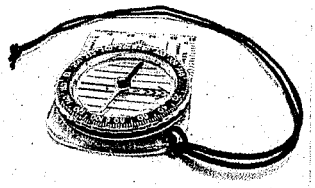
This We Believe:

- The boy and girl are more important than the projects.
- The member should be their own best product.
- No award is worth sacrificing the reputation of a member or leader.
- Competition is a natural human trait and should be recognized as such. It should be given no more emphasis than other fundamentals.
- Learning how to do the project is more important than the project itself.
- Many things are caught rather than taught.
- A blue ribbon member with a red ribbon project is more desirable than a red ribbon member with a blue ribbon project.
- To learn by doing is fundamental in any sound educational program.
- Generally speaking, there is more than one good way of doing most things.
- Every member needs to be noticed, to feel important, to win, and to be praised.
- Our job is to teach members *how* to think, not what to think.

How to use a compass

Discover the basics of using a compass and how orienteering can be a fun activity for youth to navigate.

Posted on **July 26, 2016** by **Nick Baumgart**, Michigan State University Extension



Digital navigation has taken finding locations and mapping to a new level of finding your way outdoors. GPS units and cell phones are equipped to help people find their way through city streets, country roads, to deer stands and in wilderness tracts. These are wonderful and useful tools, yet a compass still remains the very basic means of navigation. Developing knowledge of fundamental compass use is important to finding your way outdoors whether on foot, paddling or motoring. Understanding how to properly use a compass can open many new adventures and may save many as well.

Orienteering is the sport of finding your way to a location or variety of locations across the country with the aid of a map and compass. The basic premise is to use the compass to travel in a direction determined in advance by using specific techniques to go in that direction. A compass is a relatively low investment, does not require batteries, is lightweight and easily fits in a coat pocket. A good working compass can be purchased for as little as $10.

Using a compass requires understanding two basic principles: a compass needle always points to magnetic north, and a circle of 360 degrees is used to determine direction. Magnetic north is not true north. In most of Michigan, magnetic north is approximately 4-6 degrees different than true north. The adjustment to compensate for this is called declination. However, in most applications it is not

significant enough to cause a big error, but compensating for this difference provides a more accurate reading to find a location. Directions are marked in degrees on the compass circle with north being 0 and 360 degrees, east being 90, south being 180 and west being 270. Given this, a northwest direction would be 345 degrees and a southeast direction would be 135.

Using a compass correctly is relatively simple. The circular dial with degree readings on a compass turns. Turn the dial to the degree reading you wish to travel. This degree reading should be at a spot on the compass where there is a large red arrow outside the dial on the plastic base or it says "read bearing here." Always hold the compass level and with that travel arrow pointing directly away from you. Next, rotate your body so that the magnetic needle (red portion) aligns into the outlined arrow inside the dial. The large red arrow outside the dial on the plastic base points you in the direction you wish to travel. Go!

The most common mistakes made happen regularly. For some reason, people want to follow the magnetic red needle. If you do, you will always go north! Also, people have a tendency to not hold the compass level or pointing directly away from you. This is important to avoid getting an inaccurate reading. Lastly, holding the compass close to iron or steel will cause the needle to point in various directions that are not north. This can result from being too close to an automobile, a watch or belt buckle. Deposits of iron ore have also been known to cause a compass needle to misbehave.

Orienteering is a valuable skill that has many practical applications along with being fun. It can help you locate a favorite fishing spot or find your way across some woods while mushroom hunting. Orienteering courses can also be designed for a fun activity to involve youth in some outdoor survival skills. Whatever use you have for a compass, it is a skill you will use for a lifetime and be glad you know!

18 U.S.C. 707

Orienteering

PENNSTATE

College of Agricultural Sciences
and Cooperative Extension

Orienteering

4-H Club Motto
"To make the best better"

4-H Club Pledge
I pledge
my head to clearer thinking,
my heart to greater loyalty,
my hands to larger service, and
my health to better living, for
my club,
my community,
my country, and
my world.

4-H Club Colors
Green and White

PENNSTATE

College of Agricultural Sciences
Cooperative Extension

Pennsylvania 4-H Orienteering Project by Sanford Smith, extension specialist, Natural Resources and Youth Education; Jennifer Fetter, extension educator; and Andrew McDonald, cartographer.
Revised from the original 4-H *Orienteering* manual written by Jerry Rayburn, extension 4-H specialist.

This publication is made possible through Pennsylvania 4-H educational materials fees.

This publication is available in alternative media on request.

Cover produced by Ag Communications and Marketing PDF06/08 1896

WHAT IS ORIENTEERING?

The word *orienteering* can mean different things to different people. To most people in the United States, orienteering simply means to navigate or find one's way across the land or on the ocean. But, **orienteering** is also an outdoor sport widely practiced in Europe and Asia and, to a lesser extent, in North America as well. Orienteering is part race, part navigating challenge, and part puzzle. It involves finding your way in an unknown area with only a map and a compass. It requires decision making, action, and the physical stamina to carry out your decisions. Training in cross-country running can help, but it cannot assure an orienteering participant of winning. Many factors such as the terrain and weather can influence who wins! Orienteering need not, however, only be a competitive sport. It can also be a cooperative educational activity as well.

Orienteering is a combination of using map-reading and compass skills to make your way among designated locations, or **control points**, as fast as you can. Many orienteering courses are in the forest. Orienteering in the forest often requires you to obtain a compass direction on how to get to the next point. This is called a **bearing**. Then, you must stay on course if you wish to arrive at the destination without wasting time. Orienteering courses can also be set up in cities or towns. There, compass lines are not always possible to follow due to buildings and other obstructions, so orienteering becomes a map-reading exercise. Street intersections and buildings are generally marked on urban orienteering maps, and the major challenge is finding shortcuts or making offsets around buildings. Other versions of orienteering involve courses set up on ponds using canoes or kayaks (canoe-O and kayak-O), along forest trails with mountain bikes (bike-O), and in the winter snow using cross-country skis (ski-O).

Let's set some goals before you learn about maps, compasses, and the sport of orienteering.

Set Your Goals

My Name: _____

My Orienteering Project Helper's Name: _____

What I Want to Do and Learn in Orienteering in _____
(year)

1. _____
2. _____
3. _____
4. _____

MAPS

What is a map? It is a picture representation of the land. It is also a navigation tool. Maps are a way to show and store information. Maps are drawn as if you were looking at the Earth's surface from an airplane. This does not mean that maps look exactly like the Earth does from a plane. A map simply represents what occurs on the land surface. It may contain symbols that tell you locations of buildings and other land features.

What Should Orienteering Maps Include?

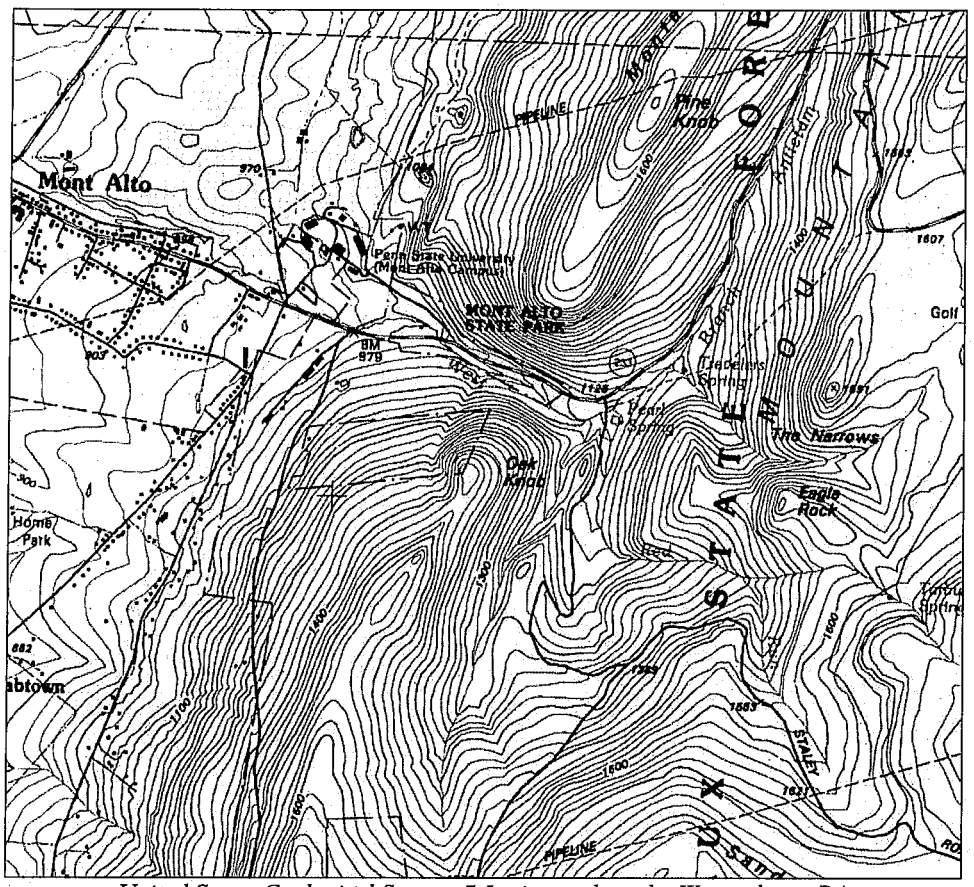
The most ideal maps for orienteering show elevation lines, called **contour lines** (or **contours** for short), and vegetative cover. They may also show other things, such as trails, power lines, roads, bodies of water, and buildings. For urban orienteering, it is possible to do without contour lines and use only a street map. Orienteering maps must also include a magnetic north arrow, not just a geographic north arrow. It is helpful if the map has printed magnetic north lines running parallel to one another across it, but these are not entirely necessary. Magnetic north lines can be hand drawn using the magnetic north arrow. A more complete discussion on this topic is below in the section entitled "Magnetic North versus True North." In general, the more detail a map has about an area, the more useful it is for orienteering and navigation. Maps should depict the actual conditions on the ground in an simple yet understandable way.

Where to Get Maps

Topographic maps are often used for orienteering, especially if a map made specifically for orienteering is not available. They were developed by the U.S. Government and can be ordered or downloaded from the U.S. Geological Survey (USGS) Web site, **store.usgs.gov**. You can download maps for free from USGS by using their "Map Locator and Downloader" tool. While it may be possible to download the map you need, you might still want to order it. To download maps, you need access to a wide-scale printer. A standard printer using 8½ by 11inch paper is not sufficient for printing most topographic maps. These maps are designed to be printed on large pieces of paper. If you cannot print a map to the size and quality that you need, carefully determine the maps you want and order hard copies. Directions are on the USGS Web site. Some outdoor stores also sell USGS topographic maps, and many public libraries make them available as reference maps. Figure 1 on the next page is sample portion of a USGS map.

Many sites (such as state and county parks) have orienteering courses with copies of maps available for purchase or use during an organized orienteering event. True orienteering maps have tremendous detail and lots of color coding on them, and because they take lots of time and energy to produce, they are often not provided for free. Participating in an organized orienteering event is a great way to learn the sport and get your hands on an excellent map at the same time.

Figure 1. Topographic map.



United States Geological Survey, 7.5 min quadrangle, Waynesboro, PA

Think of one time when you have used a map. What was it a map of? _____

What did you use it for? _____

What types of things were marked on that map? _____

Was the map helpful to you? _____

How might the map have been more helpful? _____

_____

What Maps Can Tell Us

Bjorn Kjellstorm, a world authority on orienteering, says that maps tell us five things: **descriptions**, **details**, **directions**, **distances**, and **designations**. With the information found on maps, a person can know a great deal about a place without actually being there.

Three types of things are shown on maps: (1) those that are not actually there (on the ground), (2) those that are there on the ground and shown symbolically on the map, and (3) those things that may or may not be on the ground. It is good to know which things are actually there if you are in or on your way to the field.

1) Some things found on a map that are not actually on the ground:
   - Words: names of places, roads, rivers, or ridges
   - Contour lines: these connect points of equal elevation (Map Symbols)
   - Survey grids: meridian and parallel lines
   - Civil boundaries: county, state, and city lines
   - "+" mark: the point at which the aerial photo was taken

2) Some things likely to be found on the ground and shown symbolically on the map:
   - Roads, rivers, railroads, and trails
   - Hills, ridges, and mountains
   - Towns
   - Benchmarks and surveyed section lines
   - Houses and barns
   - Churches

3) Some things that may or may not be on the ground:
   - Intermittent streams (may dry up)
   - Vegetation (changes over time)
   - Fencerows (sometimes removed by their owners)
   - Pipeline and power-line clearings (may grow back with vegetation)
   - Orchards (may be removed by the growers)

Word Bank

1. Circle things that are on a map but are not actually found in the place the map represents.
2. Underline the things that are likely to be found on the ground and shown symbolically on the map.

airport	house	river	street name	state border
road intersection	contour lines	highway number	forestland	
lake name	city boundary	school	monument	barn

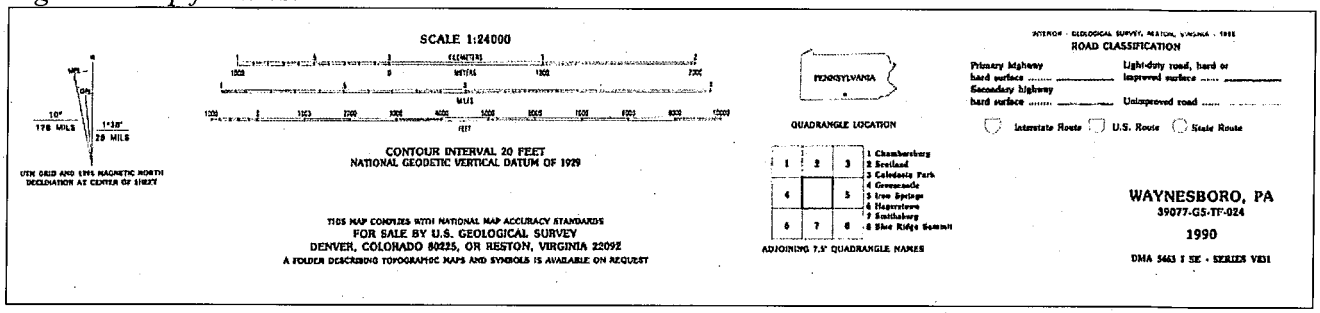
Map Features and Symbols

Maps store information in the form of symbols and features. For example, a stream is generally shown as a thin blue line. Map features are tools contained in the map to help you understand the map itself.

Map Features

Some common features are found on maps. Figure 2 below is an example of these items. A north arrow that shows both true north and magnetic north is required. Also, there may be magnetic north lines that run parallel to one another across the entire map. These lines point to magnetic north and allow you to align your compass to the map's magnetic north. The map features should also tell you the intervals between contour lines (described in more detail later). A map will contain a legend or key that enables you to determine what the symbols on the map represent. A map should also have a scale that tells you distance. An inset map may or may not be included. An inset map is a small map that shows you where the larger map is located.

Figure 2. Map features.



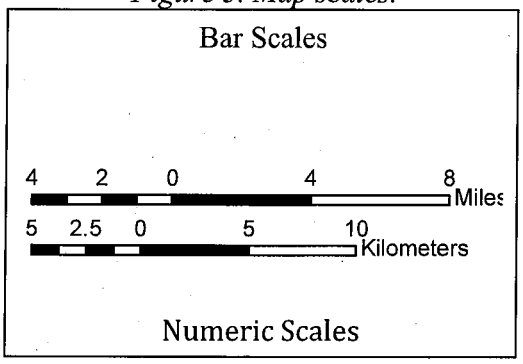
Map Scales

Scales come in two forms: numeric and bar scales (Figure 3). A **numeric scale** is generally a ratio that looks like this: 1:24,000. The ratio tells us that 1 map unit equals 24,000 units on the ground. Using the same scale, if a distance between two points on a map was measured to be 2 inches on the map, then you would multiply that by 24,000 to determine that the ground units would be 48,000 inches. Knowing that 12 inches equals 1 foot, you can make a simple conversion to feet by dividing by 12. This tells us that the distance on the ground is 4,000 feet. Now you can count your paces on the ground to determine how many feet you travel (see "Pacing: Measuring Distance by Walking").

A **bar scale** is an image of a bar that has ground units listed on it for every segment of the bar. Bar scales are more useful than the numeric scale because paper shrinks and stretches over time, which distorts the accuracy of the numeric scale. However, since the bar scale shrinks and stretches with the paper, it remains accurate. Bar scales are very useful for measuring distance on a map. To use a bar scale, line the edge of a sheet of paper connecting the two points on your map for which you want to find the distance between. Mark the points on the edge of the sheet of paper and then move the paper to your bar scale so that the first point is at the zero mark on the scale. Read the distance off the scale at the mark for your second point. Make sure you note where the zero actually is on your scale. Often, it is not on the far left of the bar but more in the center of the scale. Smaller increments on the scale are often shown to the left of the zero and can be used to measure more exact distances.

IMPORTANT NOTE: If you reproduce any map, do *not* use the numeric scale. This scale does not stay accurate if the map is altered. Use the bar scales since they shrink and expand as the maps do in copying.

Figure 3. Map scales.



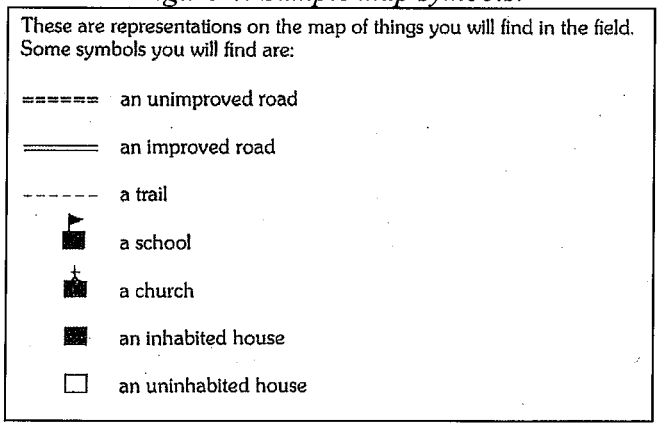
Exercise 1: Use Map 1 on page 31 in the "Examples" section.

a. How many miles is point A from point B?
b. How many feet is it from point A to "Springs" (marked with a 4)?
c. How many kilometers is "Library" from point B?

Map Symbols

Map symbols are used to represent features as they would appear on the ground. Remember that these are symbols and they only represent true items (Figure 4); variations may exist with some symbols and the items they represent. Every map will use different symbols for items, so it is important to read and understand the **legend** first. The legend will tell you what each symbol represents on the map. Features are different for every map, but there are some very common ones, such as streams, lakes, vegetation cover, swamps, roads, power lines, and contour lines. Of these, contour lines are the only feature that is not actually visible on the ground. A list of the USGS typographic map symbols can be found at **erg.usgs.gov/isb/pubs/booklets/symbols**. Some orienteering maps use additional symbols that are unique to the sport.

Figure 4: Sample map symbols.



Exercise 2: Use Map 1 from the "Examples" section. Locate the following items on the maps and list their appropriate number:

Armory_____ Jr. High School_____ Route 18_____ Pond_____ Springs_____

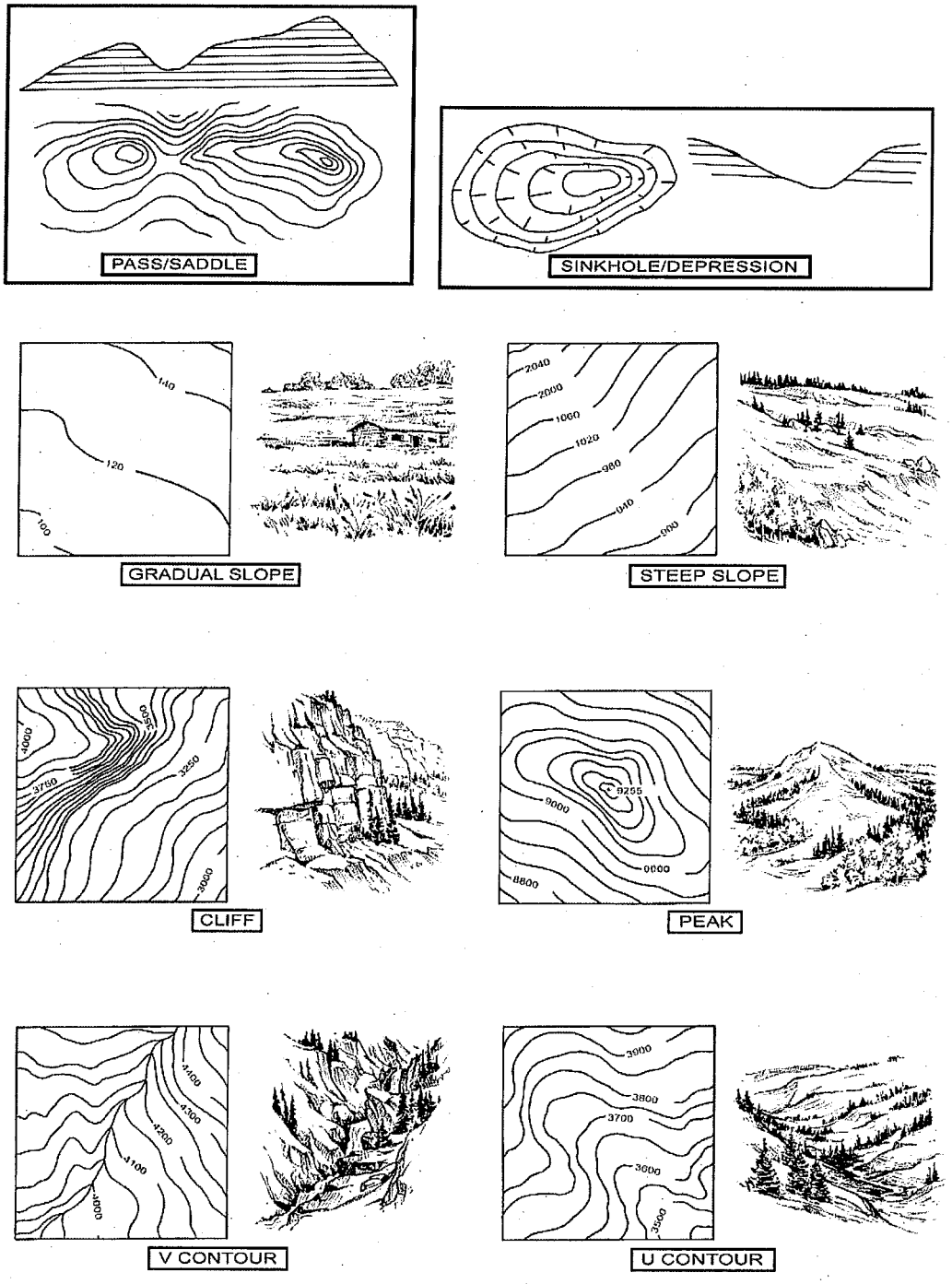
Contour Lines

Contour lines are lines on a map that represent elevation (land height above sea level). To better understand how they represent elevation, imagine yourself looking down on a mountain. At every 20 feet in elevation, a line was drawn around the mountain. In some places, the lines weave and jag in and out of valleys. The lines look irregular because their elevation does not change. So, if going in a straight line means that the elevation will increase or decrease, then the line must bend to go where there is no change in elevation. These elevation lines look like a bunch of irregular loops, one inside of another. Each line represents an elevation (for example, 500 feet). The lines are arranged in intervals so that the change in elevation between the lines is always the same as the contour interval, no matter the measured distance between them. There are some general rules to keep in mind when looking at contour lines.

1. When the contour lines are tightly packed together, then the terrain is steep in that location; when they are spread out over a large distance, the terrain is gently sloping.
2. They always make complete loops. This is true even for the contour lines that are cut off by the edge of the map. In reality, the contour lines continue on the land. If you were to take two maps that were meant to join together at the edge of the paper, you would see that the contour lines do continue and make complete loops.
3. Contour lines do not cross one another under normal circumstances, except when there is a cliff overhang present. The elevation at the top of the overhang will cause it to cross the line at the bottom of the overhang.
4. Generally, when the contour lines seem to make V shapes in the landscape, they represent valleys or gulleys in mountains—the tip of the "V" points uphill toward the upper end of the valley or gully.

Figure 5 (next page) shows some common contour line features.

Figure 5: Common contour line features. Illustrations used with permission from Brunton International.

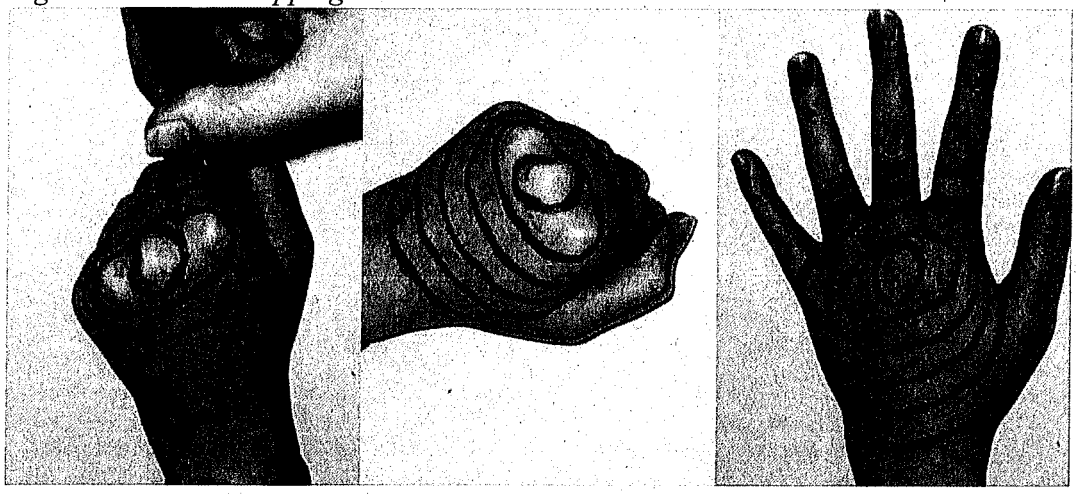


Exercise 3: Use Map 2 from the "Examples" section to complete this exercise. Label each letter with the correct contour line feature shown in Figure 5 above.

A._____ B._____ C._____
D._____ E._____ F._____
G._____

Exercise 4—Contour Map Your Hand: For this exercise, you will need a washable (nonpermanent) black or brown marker. Make a fist with your nonwriting hand and place it on a table with your knuckles up (palm side down). Draw a contour line around the top of your knuckles as if they were mountain peaks. These first contour lines will look like circles. Then continue drawing contour lines down your fist until you reach your second (finger) knuckles and your wrist. These contour lines will go all the way around your fist and your knuckle mountain peaks. Next, open your hand up and lay it flat on the table. Now you are looking at a contour map. If you make a fist again, you are looking at the "actual" landforms. Show your contour map to your teacher or group leader and explain what it represents.

Figure 6. Contour mapping a hand.



1. When you laid your hand flat, were lines were close together at any place? Describe how those parts of your hand looked when your hand was in a fist. _____

_____

2. Where was the highest point on your hand when it was in a fist? _____

3. What did the contour line drawn there look like? _____

4. What kind of land formations do you think are similar to the shapes of your hand? _____

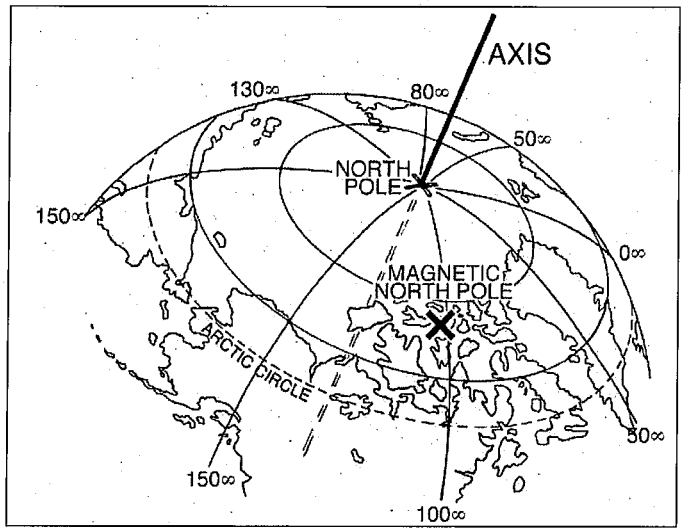
_____

Magnetic North versus True North

It is important to understand the difference between true north and magnetic north. The Earth has two "north poles"—the magnetic north pole and the true (geographic) north pole. The true north pole is located in the frozen Arctic Sea at the "top of the world." This is the north pole most familiar to us, as well as what many maps show as being at the direction of north. True north and true south are also where longitude lines meet.

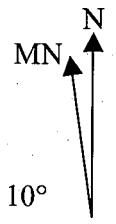
Magnetic north is different from true north. It is currently located in the Canadian arctic (Figure 7). Magnetic north is the result of large metal deposits beneath the ground that are slowly shifting each year. At this location, magnetic field lines are oriented vertically and plunge into the surface of the Earth. This means that you cannot use magnetic north as true north or vice versa. Doing so will lead you severely off course. All compasses point to magnetic north; however, some compasses are adjustable so that they appear to be pointing to true north.

Figure 7. A depiction of the true north pole and the magnetic north pole. Used with permission from Brunton International.



The difference between magnetic north and true north is always shown on topographic and orienteering maps (Figure 8). The angle of declination (the difference between true north and magnetic north) is shown as a number with the degree (°) symbol. If the magnetic north (MN) arrow is shown to the right of the true north arrow, then the angle of declination is to the east; if it shown pointing to the left, then it is a west declination.

Figure 8. The north arrows from the bottom of a topographic map depicting the difference between true north and magnetic north.

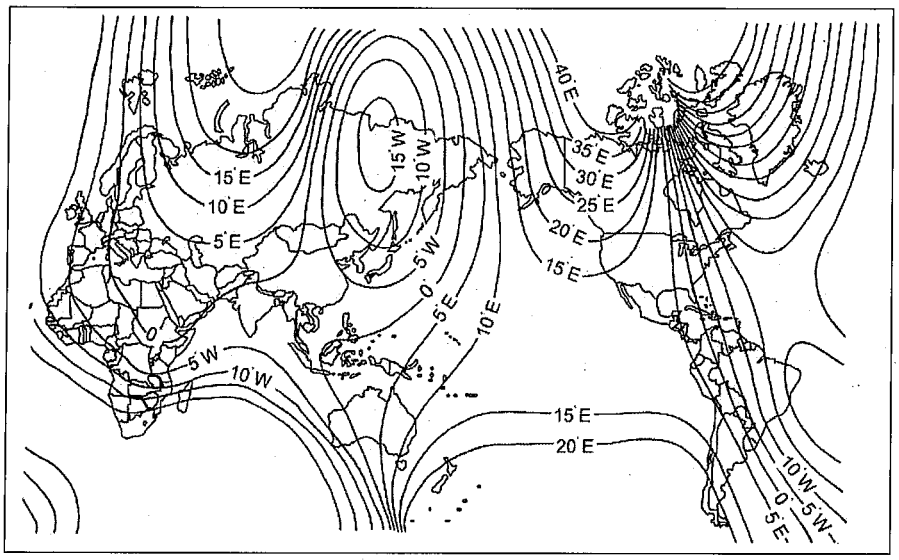


Declination

The difference between true north and magnetic north for any specific location is called the **angle of declination**. If you are using a compass that does not allow you to adjust for the angle of declination, you must account for this difference when using a compass with a map. The angle of declination is given at the base of every topographic map. Declination changes depending on where on Earth you are (Figure 9). An exact determination of the angle of declination for most locations can be found by going to **www.ngdc.noaa.gov/geomagmodels/Declination.jsp**.

The changes in declination are caused by differences in the magnetic pull of the Earth. If your map does not indicate magnetic north, you can use the true north arrow and the angle of declination to determine the direction of magnetic north. You may want to draw magnetic north lines across your map, and then when you are holding your compass on your map to determine a bearing, turn the compass housing until the orienting arrow points in the direction of the magnetic north lines and *not* true north at the top of the map. This is explained more in "The Compass" section of this project book.

Figure 9. Current changes in the angle of declination across the Earth. (Used with permission from Brunton International.)



Notice how the 0° line runs through Florida and up to the Great Lakes region of the United States. Accounting for declination in these areas will have little effect on your compass readings. However, in other parts of the country, such as northwestern Washington state or the northern tip of Maine, it can make a dramatic difference (15° to 20°).

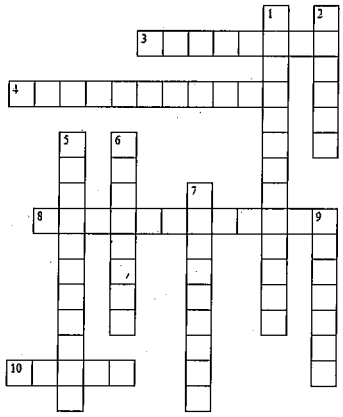
How to Make Magnetic North Lines on a Map

For orienteering, it is helpful to have magnetic north lines drawn on your map. Magnetic north lines are a series of parallel lines that run south to north across the map and have arrows on them that point in the direction of magnetic north. If your map already has magnetic north (MN) lines drawn on it, then this step is not necessary. To eliminate confusion in the difference between magnetic north and true north, some map preparation can be helpful.

1. Place a ruler (straight edge) or yardstick along the magnetic north arrow on the map. Make sure it is lined up exactly with the arrow to ensure a line that is truly magnetic north.
2. Extend this line completely across the map using a sharp pencil.
3. Cover the map with magnetic north lines by drawing parallel lines with the yard stick (parallel to your first line). Use the thickness of the yardstick as the distance between lines.
4. Place arrows on the lines that point to north to prevent being confused between north and south.

Exercise 5: Use Map 3 in the "Examples" section to complete this the steps above. Print out or make a copy of Map 3. Draw magnetic north lines on it using a straight edge, a pencil, and the magnetic north arrow. What is the angle of declination? _____

Maps Summary



ACROSS

3 More useful than the numeric scale because over time, paper shrinks and stretches
4 Angle of ____ (the difference between the true north and magnetic north)
8 Elevation lines on a map
10 Contour lines found very close together might represent this type of land feature

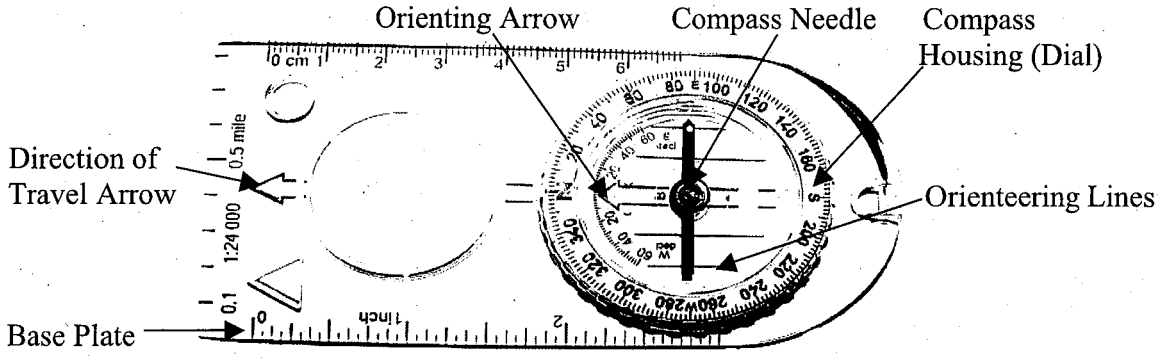
DOWN

1 Currently located in the Canadian arctic as a result of large metal deposits beneath the earth
2 Tells you what each symbol represents on the map
5 Map type developed by USGS, often used for orienteering
6 Tools that are contained in the map to help you understand and comprehend the map itself
7 Located in the frozen Arctic Sea at the top of the world
9 Used on a map to represent features as they would appear on the ground

THE COMPASS

You will need to obtain a compass suitable for orienteering. A good orienteering compass will include these key features shown in Figure 10. It should have a free-floating needle in a liquid-filled housing. The housing dial should be marked in tic marks that go from 0 to 360 degrees (or *azimuths*). The housing of your compass needle should turn easily and stay still when not being moved about. Another key feature of a good orienteering compass is a base plate. The base plate is transparent plastic, helps you hold the compass level, and has useful measurements and scales along its straight sides.

Figure 10. The parts of an orienteering compass.



It is necessary to know and understand the parts of a compass and their functions. The **magnetic needle** is the most important part of a compass. The needle floats in a liquid inside the **compass housing**. This liquid is usually oil or kerosene that keeps the needle from bouncing around too much. The needle has two ends, one red and one black (or white). The red end always points to magnetic north. The black (or white) end always points south—opposite of magnetic north. The compass housing is the raised circular portion of the compass. The **orienting arrow** is located below the magnetic needle inside the compass housing. Notice that as you turn the compass housing, the orienting arrow turns with it. Alongside the orienting arrow you will notice a series of lines that are parallel to it. These **orienteering lines** will help you align the orienting arrow to the map. Located on the compass housing is a dial marked in increments up to 360 degrees (or *azimuths)*. This is what you will use to read a bearing. A bearing is the clockwise angle from north (0° or 360°) you will travel. Finally, located on one end of the **base plate** (outside of the compass housing) is the **direction of travel arrow**. This arrow is stationary and will point you on your way.

Exercise 6: Look over your compass and identify its parts. Show each part to your teacher or leader and explain its importance.

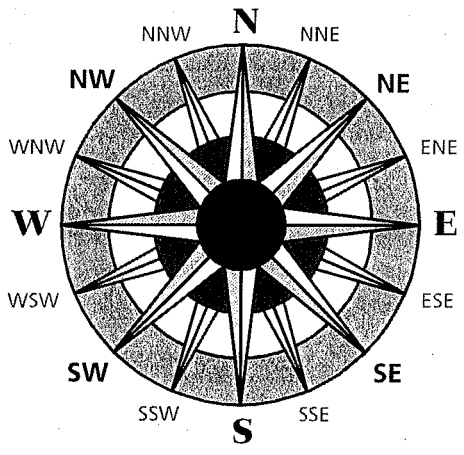
It is best to first use your compass to simply discover where north, south, east, and west are before you go any further. These are called the main, or cardinal, directions. They are always the same in relation to one another. This means if you can find north with your compass, you will always know where the other directions are as well. East is always at 90° to the right of north, south is always opposite (180°) of north, and west is 90° to the left or north, located at 270°. Put another way, if you stand facing directly north, east will always be to your right, west to your left, and south is straight behind you. Some compasses are marked with N, S, E, and W for these cardinal directions while others are not.

In order to obtain a true reading of where magnetic north is, you must **hold the compass level, slightly away from your body, and away from any metal objects**. Even a set of keys, a belt buckle, or a nearby metal sign post can interfere with the Earth's magnetic field and distort your reading of north. While standing outside, follow these two steps: (1) Turn the compass dial so that north (0° or 360°) is aligned with the direction of travel arrow (on the base plate) pointed directly away from you. (2) Hold the compass level and turn your body—not the compass—until the magnetic needle (the red end) is aligned in the middle of the orienting arrow (in the bottom of the compass), which should also be in line with the direction of travel arrow. This is called "boxing the needle," or "putting red in the shed" as a simple way to remember what to do (Figure 12). You are now facing north, and south is directly behind you. East is to your right and west is to your left.

To walk toward magnetic north, simply follow the direction of travel arrow and keep the compass needle lined up inside the orienting arrow. Now you know how to use the compass to find basic directions. However, this is not enough for navigation. You need to also know where you are and where you are going. For this we need to go back to a map.

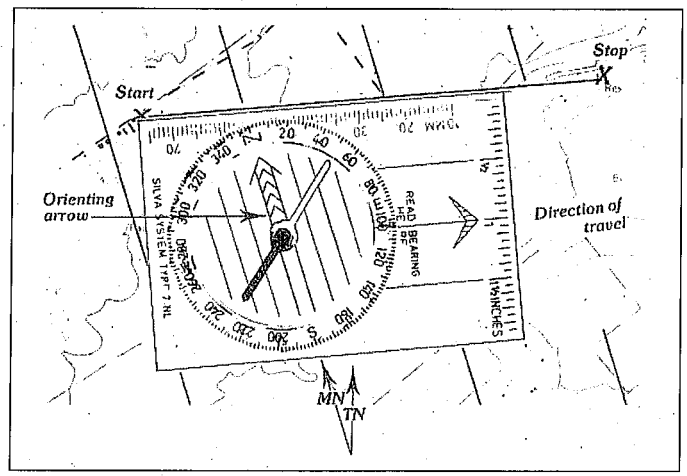
Exercise 7: Make a simple map of any outdoor location. The area can be of any size. Draw in all the main features of the location and then use your compass to put a properly oriented compass "rose" on the map (Figure 11).

Figure 11. Compass rose showing cardinal and intermediate directions.



BEARING

Figure 12. Finding your bearing from a map.



Bearing on a Map

In orienteering, you are traveling from one point to another point on the ground and, in a sense, on your map. The location of both points on the map must be known. In order to travel to the destination point, you must first obtain a bearing from the map. The bearing will enable you to travel in the proper direction on the ground.

1. First, find where you are and where you want to go on the map. Next, draw a straight line from where you are (Start) to the where you want to go (Stop) using a ruler or the straight edge of your compass. Be careful to be accurate in your beginning and end points of the line. Even small errors can be magnified, sending you off course and wasting time.
2. Lay the long side of the compass base plate next to the line you just drew so that the direction of travel arrow is pointing to where you wish to go.
3. Hold the compass firmly in place. Twist the compass housing until the orienting arrow and its accompanying parallel lines are parallel to the magnetic north lines that are on the map. Make sure that the orienting arrow is pointing to the north, not the south, on the map. The magnetic compass needle is *not* used in this step (Figure 12).
4. Carefully read the number indicated by the graduations on the compass housing dial at the direction of travel arrow. If the dial indicates a bearing between two numbers, you will have to determine the bearing by adding or subtracting the tic marks (lines) from the nearest number. Each tic mark on most compasses is usually 2° apart. On the compass in Figure 11 you would read 104°.
5. Ask yourself if the reading makes sense. If you are traveling east (toward the right side of the map, if north is at the top of the map), does the reading fall between 50° and 130°? Are you traveling south (toward the bottom of the map)? Does the reading fall between 140° and 220°? Are you traveling west? Does the reading fall between 230° and 310°? Are you traveling north? Does the reading fall between 320° and 40°? **If your reading does not make sense, then remeasure it.**

Once you have completed these steps, you have a bearing and are ready to use it to find your way. You should record the bearing in case the compass housing is accidentally bumped or turned. If this happens, you can reset the bearing and continue.

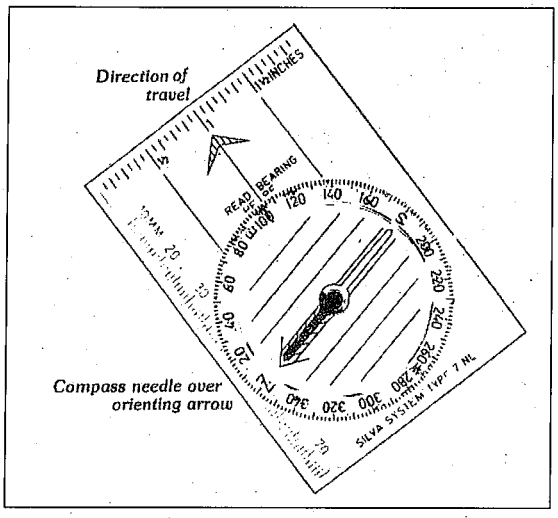
Exercise 8: Use the printed version of Map 3 on which you drew magnetic north lines.

a. What is the bearing in degrees if you are traveling from point 1 to "Five Forks"?
b. Now, what is the bearing in degrees from "Five Forks" to point 2?

Using a Bearing on the Ground

Now that you have obtained a proper bearing from the map, you can navigate to your destination. If your compass is not already set to the proper bearing, do so now. To do this, you should turn the compass housing dial so that the bearing you want to travel is at the base of the direction of travel arrow. In order for the bearing to direct you to your destination, you must be located at the exact start point you located on the map.

Figure 13. A compass with the magnetic needle correctly aligned over and "boxed" inside the orienting arrow ("red in the shed").



1. Hold the compass level and steady in front of you with the direction of travel arrow pointed directly away from your body. **Be sure to be clear of metal!**
2. Turn your body, feet and all—not the compass—until the magnetic compass needle is aligned ("boxed") inside the orienting arrow. The red, or north, part of the magnetic needle should be over and inside the orienting arrow and pointing in the same direction as the orienting arrow (Figure 13). Wait for the needle to settle and make sure it is still inside the orienting arrow. You are now facing directly toward your destination.
3. Follow the direction of travel arrow carefully. **Note:** Unless your course is heading directly toward magnetic north, then you will be heading in a different direction than the compass needle. Never follow the direction the compass needle is pointing unless you want to walk north!
4. Be careful to keep the compass needle within the orienting arrow while traveling this route! It is likely that you will encounter some obstacles if you try to walk a straight line. The upcoming section on how to navigate from point to point will help you deal with these challenges.
5. Arrive at your destination!

USING THE COMPASS TO DETERMINE DISTANCE

Your compass can also be used to determine ground distance while using a map. The base plate of your compass should have measurements on it. Use these to measure the distance you want to know on a map. Be sure to remember or write down the measured distance. Now compare your compass measurement scale to the bar scale on the map. With the knowledge of your map measurement, you can now figure out the ground distance between the two points.

You may have to move the compass multiple times to get a measurement between two locations. To do this, line the compass in a straight line between the two points, and measure to the farthest measurement marked on the base plate. Using a pencil and while keeping the compass still, mark the end of the measurement on the map. Now, move the compass so that "0" lines up with this mark and continue measuring. Continue with this until you have your measurement.

PACING: MEASURING DISTANCE BY WALKING

When orienteering, it is important to keep track of the distance that you have traveled. Knowing this, you can determine how far you still need to travel to reach your destination. Distance is measured by **pacing** off the distance you walk. Accurate pacing requires *practice*!

On a straight and level place, measure 100 yards (you can also do this in meters) with a measuring tape or wheel. If you do not have a 100-yard measuring tape, try using a football field. Starting with your left foot at the beginning of the 100 yards, walk naturally and count every time your right foot touches the ground. Your pace is the distance you have traveled in 2 steps (Figure 14). Do this 10 times on your 100-yard course and average the results. If possible, lay out a 100-yard (or meter) course on a hillside. Check your pace uphill and downhill. Note the number of paces more it takes to cover 100 yards going uphill and the number fewer to cover such a distance downhill. Complete the sentences below.

1. To walk 100 yards (meters) on level ground, I must take (on average) _____ ("A") paces.

2. To walk 100 yards (meters) uphill, I must take (on average) _____ more (than "A") paces, for a total of _____ paces.

3. To walk 100 yards (meters) downhill, I must take _____ fewer (than "A") paces, for a total of _____ paces.

Now divide each of the average number of paces recorded above and divide them by 100. This will tell you how many yards (or meters) you travel for each pace you take under these three conditions (level, uphill, and downhill). Knowing your distance per pace and a few simple unit conversions will make it easier for you to quickly determine how far you have traveled.

Fill in your pace measurements here:

On the level my pace = _____ yards (or meters)

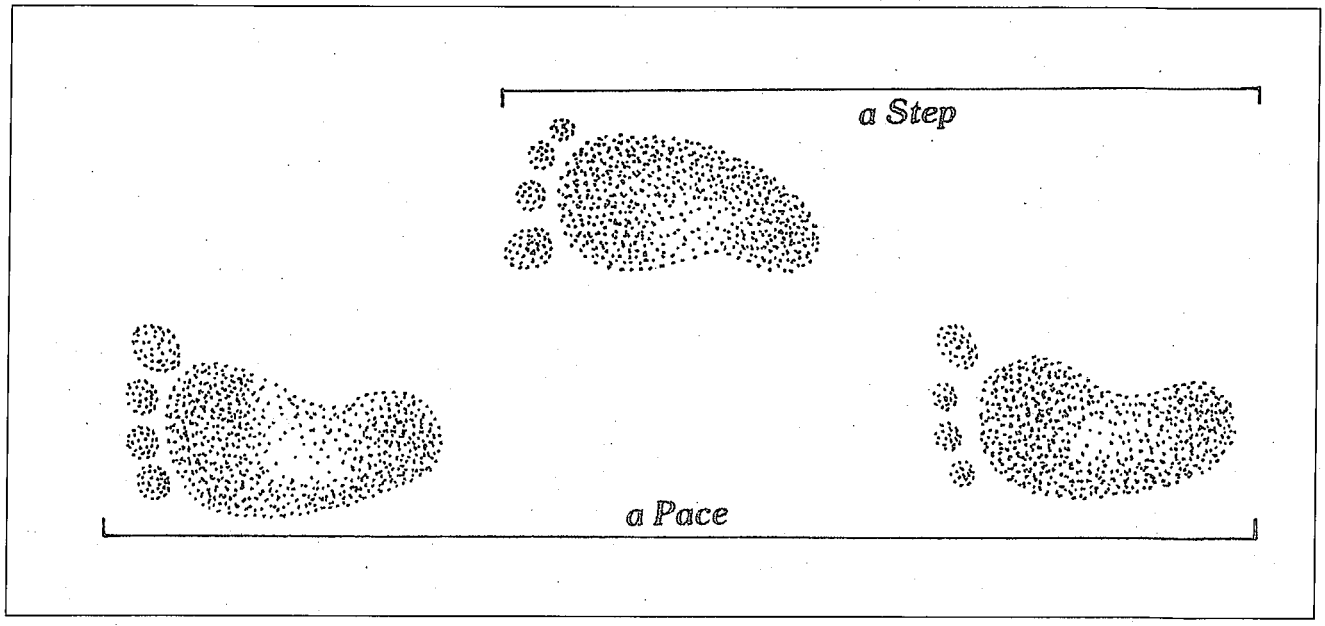
Going uphill my pace = _____ yards (or meters)

Going downhill my pace = _____ yards (or meters)

There are 1,760 yards in a mile. I take _____ paces per mile.

There are 1,000 meters in a kilometer. I take _____ paces per kilometer. (If you measured your paces in meters.)

Figure 14. A pace versus a step.



If you know the distance between two points, you can predict how many paces it will take for you to get there. As you walk from your starting point toward your destination, count the number of paces you take (every two steps), or count down from the predicted number of paces. An easy way to count your paces is to take your first step with your left leg and count each time your right foot hits the ground or vice versa. Don't forget to keep paying attention to your compass as you count your paces. Is red in the shed?

HOW TO NAVIGATE FROM POINT TO POINT

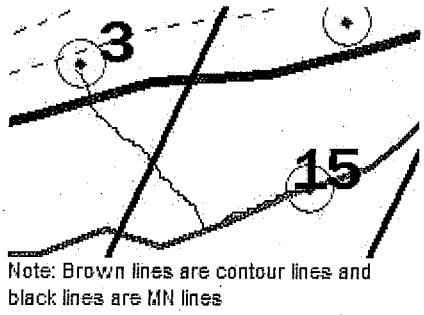
Once you have your bearing on the ground, you can simply head for your next point by making sure that you do not stray from your bearing. It can take time to stay on the proper course, and obstacles may come up along the way that will throw you off. Remember that in an orienteering competition, time is important. Often, it is best to head to a nearby landmark and then navigate from there to your next point. To choose a proper landmark, find something that is distinguishable on the ground and run toward it. From there, find your bearing again and continue heading toward the precise location you are trying to reach. For example, if you have determined your bearing and are pointed in the right direction, look ahead of you. Do you see a boulder, road, lake, building, or other object that is right in line with your direction of travel? Instead of walking forward while constantly focusing on your compass, run to the landmark ahead and then take your bearing from there again. It's easiest if you choose an object or landmark ahead of you that will not be forgotten or confused with another one near it.

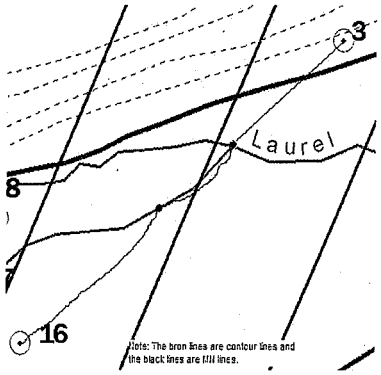
Here's another way to navigate. Let's say we are at point 16 in figure 16, below right, and we want to go to point 3. A wise decision would be to set your bearing for point three then aim a little to the left. This way, you will come across the creek and can run to it because an accurate bearing is not important. It is faster to run and follow the creek than to maintain an accurate bearing directly to point 3. Then, follow the creek to the right until you reach the fork in the stream. This is a great landmark that you will notice on the ground. From there, obtain your bearing to point 3 and follow it quickly and carefully. This method allows you to travel faster while still being accurate.

Sometimes all you have to do is aim off of the point a little bit. Then once you reach your landmark, you can follow it to the next point. This is depicted in figure 15, below left, in the route from point 3 to point 15.

Another challenging situation is when your destination is located on the opposite side of a hill or mountain. Here you should pay special attention to the contour lines. Try not to travel in a path that will cause you to unnecessarily change elevation. Doing so may cause you to waste energy and time.

Figures 15 and 16. Wise routes.



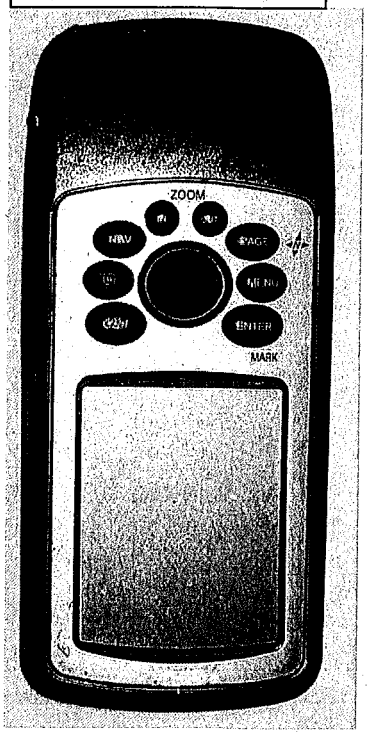


GPS

In addition to maps and compasses, the global positioning system (GPS) is another technology useful for navigation. GPS tells you your exact location on the ground using **latitude** and **longitude** numbers or **coordinates**. Orienteering contests do not use GPS, but it is useful to understand how it works and how it relates to navigation and mapmaking. There are three key components to GPS: the satellite network, the user, and the GPS unit itself.

The satellite network is a group of 21 satellites that are orbiting the Earth but in fixed positions. This means they stay over the same location as the Earth spins. They are said to be **geostationary**. This network of satellites is constantly sending signals back to earth. A GPS unit is a handheld device that receives these satellite signals and uses them to tell you your exact location on Earth (Figure 15). In order for the GPS unit to determine your location, it must be receiving a signal from at least three satellites. Also, if there is a fourth satellite signal available, then the GPS unit can determine your elevation. The user of the GPS unit can then interpret this location information.

Figure 17. GPS unit.



There are many different types of GPS units and they range from $40 up to thousands of dollars. Units that cost thousands of dollars can be accurate to below a centimeter, while cheaper units may be accurate to within 30 to 50 feet. The precision of the elevation measured by a GPS unit is often less accurate than this and generally should not be relied on too heavily. Some units have maps built into them and, depending on the quality, are used for navigation. There are also GPS navigation systems for cars, but these only help you navigate roads. It is important to read and understand the user manual for the GPS unit you are using.

GPS units not only give you your current location, but they can also store location information. They store information in two forms: waypoints and tracks. A **waypoint** is a single point at a specified location. **Tracks** are a series of waypoints that when connected together in order to create a line of travel. Waypoints and tracks can be stored for ground features and later uploaded to a computer. This uploaded data can be used to map features and create maps.

It is also possible to use previous locations that were visited and navigate to them using the GPS unit. You can navigate to waypoints using a "go to" feature within the GPS unit. This shows you a line from your current location to the desired point. Then you can navigate to that waypoint. Also, if you just have a latitude and longitude, you can put this information into the unit and navigate your way to that location. Another option is to download waypoints or tracks from a computer to the GPS unit.

Geocaching

Geocaching is a completely different type of hobby or sport from orienteering. It is less or noncompetitive than orienteering and uses a handheld GPS unit and the location coordinates of **caches**. Caches are like hidden treasure. The participant must find the caches located around the countryside using the specified coordinates and a GPS receiver. The cache is usually a waterproof container with a logbook to sign and a small item that you can keep to remember the location. You should replace the item with another that you brought along. Many people like to participate in geocaching just for the personal challenge and fun of getting outside. To read more about geocaching or find geocache locations near you, go to **www.geocaching.com**.

Optional Activity: Try Geocaching and Record Your Experience

Date you went geocaching: _____

Name of geocache that you looked for: _____

Did you find the geocache? _____ What was inside? _____

_____

What other interesting things did you see while you were looking for the geocache?

_____

_____

Do you think that geocaching is an activity you might try again some day? _____

What was your favorite part of geocaching? _____

_____

PREPARING FOR ORIENTEERING

When entering an orienteering contest, you should know if you are competing alone or in pairs. If you will be working in pairs, one person should do all the pacing and the second person should handle the compass work. Expect to be given a map and a card to record your experience either by writing down the code letters or by using a punch when you get to each station. Bring your own pencil and compass. You may also be given a number to indicate your approximate starting order.

At the starting line, wait until the official tells you that you may look at the map. Other people will be there too. Usually, there are several maps and you can use any free one. You should not measure direction from the contest map. You are only to transfer the dots and their corresponding numbers from the contest maps to your map. These dots are the stations (often called **controls** in orienteering) that you must find in the field.

As soon as you have transferred these dots, move away from the contest maps. You will have several minutes to do this. Time has started on you! Plan your strategy. Which station do you want to go to first? Which are you sure that you can find? Measure the direction from point to point **as you expect to travel them**. Measure the distances and convert them to your paces.

As you go, remember that you are looking for control markers. These can vary in each contest, so be sure you know what you are looking for. Traditional control makers are an orange and white flag or kitelike arrangement with a code written on it and (Figure 16) a punch hanging beneath it. Your score is determined by your running time plus a penalty for every control station that you miss. Missing a whole station will add to your score. The lowest score wins! Good orienteering demands accuracy and hustle.

Opportunities for Beginners and Advanced Orienteers

If you decide to try a professional orienteering event, here are some things that might help you. Most orienteering groups set up multiple courses during an orienteering event. The courses will most likely be set up by level of difficulty. If the event is run by an organization that uses the U.S. Orienteering Federation (USOF) guidelines, then the courses will be color coded. Each color stands for a different level of difficulty, as listed below.

- **White:** Beginners. Shortest length (usually 2 to 3 kilometers) and mostly on trails or in open field areas. This is the competitive level for youth 12 years old and younger.
- **Yellow:** Advanced beginners. A little longer course (2 to 3½ kilometers) and still on trails and fields, but some route choices will have to be made. This is the competitive level for 13- to 14-year-olds.
- **Orange:** Intermediates. This course is typically 3½ to 4½ kilometers long and will include a mix of on- and off-trail traveling. You may have to overcome some physical challenges in this course. This is the competitive level for 15- to 16-year-olds.

There are also **brown-** , **green-** , **red-** , and **blue**-level courses. These courses all require the same advanced skills but are different in length and physical requirements. These courses should not be attempted until you have mastered the orange-level course.

If you are not sure where to start, you should probably go with the white course first. If you have been practicing, you might be okay to try yellow. The best thing to do is talk to the person coordinating the event. He or she will guide you to making the right choice.

If you would like to try orienteering with a very young child, you might be lucky enough to find a string orienteering course (String-O). In string orienteering, the course is marked with a continuous piece of string or ribbon and a very simple map is included. There is no need to use a compass in String-O, just follow the ribbon to find the controls. This a great way to introduce young children to basic map-reading skills and get familiar with the idea of orienteering.

How to Find an Orienteering Opportunity in Your Community

There are several different ways to experience orienteering courses. You can set up your own course with a small group, like your 4-H club (see "Organizing a 4-H Orienteering Contest" section). You could also participate in an orienteering class or contest at a local park or other outdoor facility.

Some parks have permanent orienteering courses set up in which you can participate at any time. These types of courses are great places to learn about orienteering and practice your skills. In the case of permanent orienteering, the course is usually marked with some type of fixed marker on a landmark (tree, building, etc.) or on a wooden post set in place at the control point. Markers may look similar to the control flags used in a temporary course—often painted with the two-color triangle symbol. In some cases, the park may choose not to use any markers at all but instead require you to answer a specific question about a feature at the control point. To use these courses, you must get a copy of the course map, which are usually available from the park (if they have an office, try visiting there) or from the orienteering club that set up the course. You may have to pay a small fee for the map or make a security deposit that guarantees you will return the map when you are done. To find a permanent orienteering course near you, contact your local state, county, or municipal parks, national parks and forests, or the closest orienteering club (see the end of this section for tips on finding an orienteering club near you). Many parks also schedule special events where an orienteering course is set up for an educational program for which you can sign up. Keep an eye on local park event calendars for opportunities like this.

Here are some great examples:

- Allegheny National Forest—Heart's Content Recreation Area permanent orienteering course in Warren, Pa.: **www.fs.fed.us/r9/forests/allegheny/recreation/hiking/orienteering**
- Pennsylvania State Parks—various permanent courses: **www.dcnr.state.pa.us/stateparks/recreation/orienteering.aspx**

There are also lots of orienteering clubs and competitive organizations that set up courses for single- or multiday competitive events at any number of locations. Temporary courses of varying difficulty (as previously described) are set up just for that event so that no one can practice them in advance. Participants sign up for a course of their choice and then receive a map and a start time. When you complete the course—with all the control points visited correctly, of course—your total time will be calculated and you can compare it to those of other participants. Sometimes awards are given, and in other cases the event is only for personal accomplishment. These events typically have entry fees and in many cases require you to carry an emergency whistle with you during these events. If you do not own a whistle, they are often for sale at the event. To find a competitive orienteering event, contact your nearest orienteering club.

In addition to traditional orienteering events, you might also find some alternative orienteering opportunities such as ski orienteering, mountain bike orienteering, canoe orienteering, urban orienteering, and trail orienteering (an opportunity for differently abled persons to all participate together).

How to Find a Local Orienteering Club

Most orienteering clubs are registered with the U.S. Orienteering Federation (USOF), which lists clubs by region of the United States on their Web site (**www.us.orienteering.org**). Each club typically has their own Web site and contact name, address, or phone number.

For example, in and around Pennsylvania there are several orienteering clubs, many of which have set up permanent courses and have competitive events. They include:

- Delaware Valley Orienteering Association (DVOA) serves eastern Pennsylvania along with parts of Delaware, Maryland, and New Jersey. **www.dvoa.org**
- Susquehanna Valley Orienteering serves south-central Pennsylvania around the Harrisburg, Lancaster, and Shippensburg areas. **www.furlong47.com/svo**
- Western Pennsylvania Orienteering Club covers much of western Pennsylvania from Johnstown to Indiana, including Allegheny County and sometimes into Warren County. **www.wpoc.org**

There are many more clubs in the United States and plenty of opportunities to become involved in orienteering. You may even be interested in national and international events some day as you become more advanced. Welcome to the world of orienteering!

Figure 18. An orienteering station marker with punch.

Do Some Orienteering Research

What parks are near your home? _____

_____

Contact those parks. Do any of them have orienteering courses or programs they offer?

_____

Use the internet to find an orienteering club in your area. What is the name of the nearest club?

_____

What are some of the locations of their orienteering events? _____

_____

How can you find out more about this club (phone number, Web site, e-mail address, etc.)?

_____

4-H PROJECT REQUIREMENTS

Participation is expected in three orienteering contests the first year and one more for each succeeding year (up to 10 per year). After three years, a member is expected to help set up a contest each year.

An orienteering roundup or fair exhibit consists of orienteering score cards displayed on a 20 by 15 inch poster board with a school picture of the member.

Advanced orienteering exhibits consist of maps of the orienteering course set up by the member and the official roster of the participants. Pictures taken at the event may be displayed. A set of orienteering station markers may also be made.

Orienteering presentations consist of talks on maps, compasses, map construction, and compass making or other related topics.

Surveyors, professional civil engineers, and planners make excellent speakers for groups interested in orienteering. Visits to planning offices, surveying headquarters, and county repositories of deeds and maps are interesting field trips.

ORGANIZING A 4-H ORIENTEERING CONTEST

Objectives

- To provide a safe, challenging course for the application of skills in 4-H orienteering.
- To provide competition at a level appropriate to skill levels.
- To develop a life skill that enables people to cope with and enjoy the natural environment.

Steps

1. Prepare proper communication to prospective participants or lay groundwork with an educational program. Make sure participants know if they are to work in pairs or solo and if they may (or must) provide a compass.
2. Gather equipment:
    - athletic stopwatch with capability to do "split" times
    - four cardboard squares (at least 12 inches per side) and masking tape to attach maps with stations marked on them
    - some extra pencils
    - rulers
    - supply of photocopied maps
    - record sheet for official calculation of results and starting times (see appendix)
    - a small table and chairs for officials
    - 5 to 7 station markers (see appendix).
3. The course may be run solo or in pairs. A drawing is held for starting positions. Four official maps are attached to cardboards laid on the ground about 50 feet from the starting point.
4. At one-minute intervals and in numerical order according to the drawing, participants advance to the boards and transfer the station markers from the official maps to their own copies. They may measure the course on the official maps, but they must *not* mark on these maps! They also must move away after four minutes if there are four official maps, or three minutes if there are three official maps. This makes room for other participants.
5. Participants may choose whatever routes they want between the stations. The stations may be found in any order. The three-letter code must be recorded for scoring.
6. Scoring: Total running time is calculated when the participant lays his/her score card on the table. The score is a combination of running time plus a one-additional-minute penalty for every letter recorded wrong. The first station not found will add 10 minutes to the time. Each additional station missed adds 60 minutes.
7. Have a plan to end the contest. Suggest that after 2 hours a bell will be rung or auto horns will be honked. This will be continued every 10 minutes until everyone is accounted for. Select an area enclosed by roads or creeks. Then tell the participants what to do if they encounter a perimeter boundary.
8. Use a team approach to orienteering when participants are inexperienced. When this is used, one participant takes the bearings and one paces. Pairing for teams is at the discretion of the sponsors. This means that the sponsor either allows participants to choose partners or they will be assigned at random.

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Orienteering and Map Links

Ben Meadows Company: **www.benmeadows.com**

Brunton: **brunton.com**

Forestry Suppliers, Inc.: **www.forestry-suppliers.com**

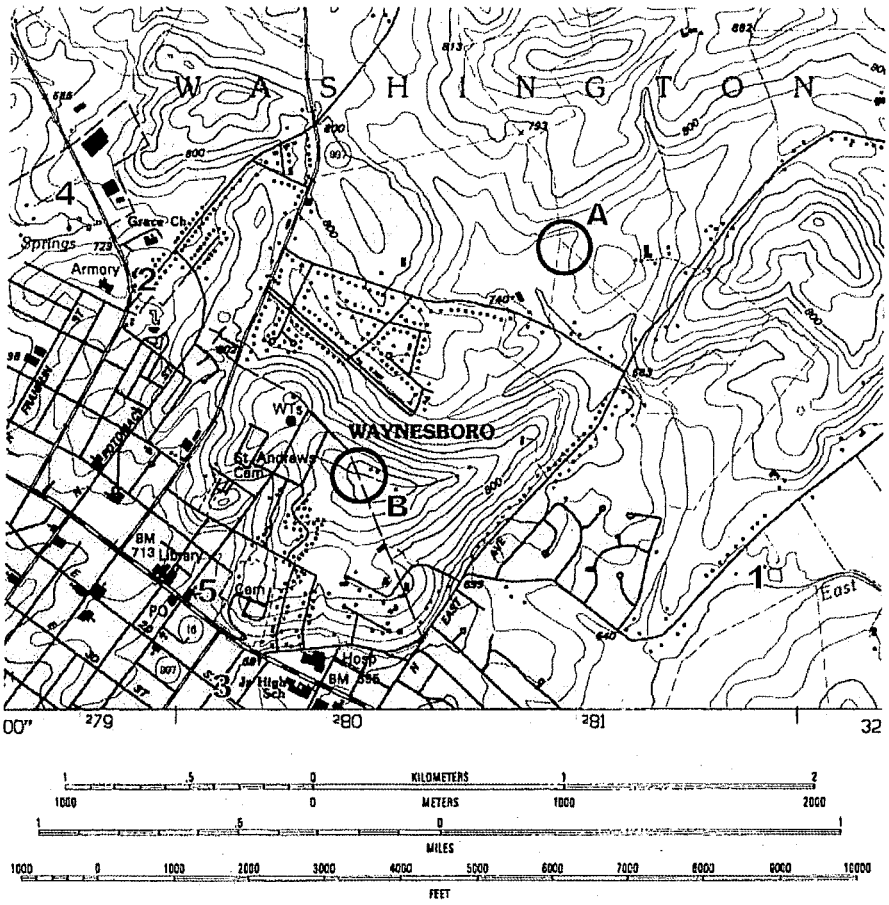
Johnson Outdoors, Inc.: **www.johnsonoutdoors.com**

O'Gear: **www.us.orienteering.org/OGear.html#equipment**

U.S. Geological Survey Store: **store.usgs.gov**

EXAMPLES

Map 1

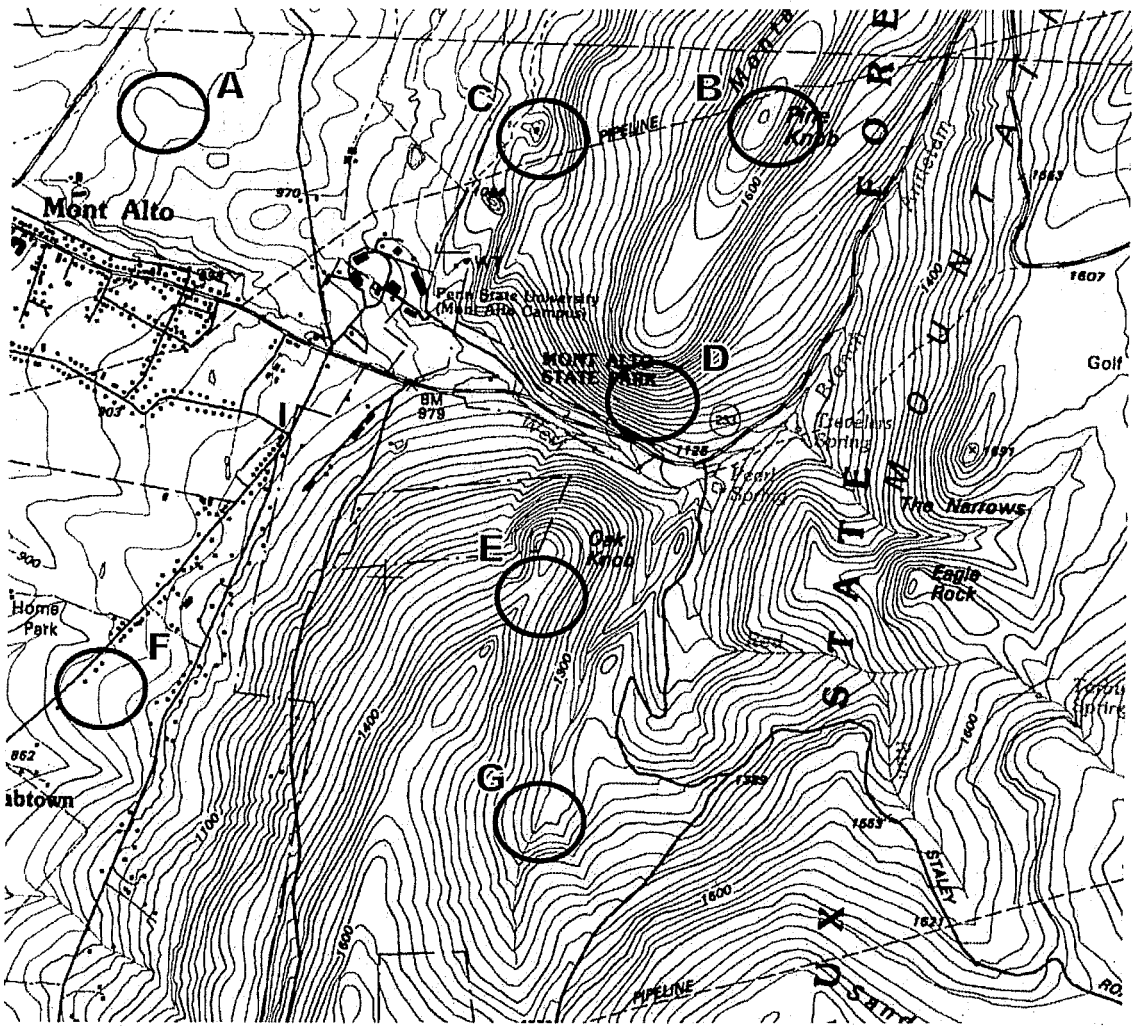


CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

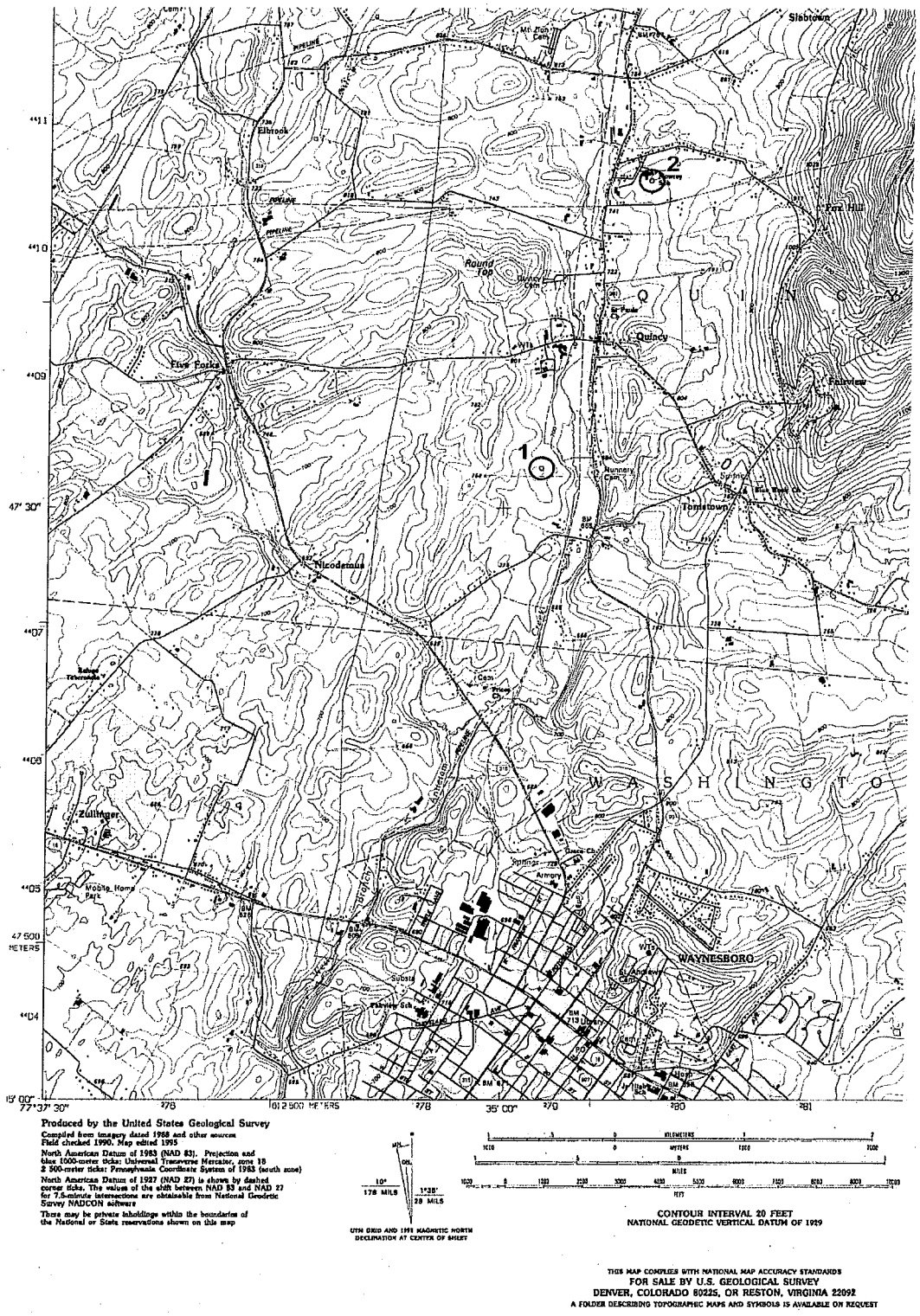
United States Geological Survey, 7.5 min quadrangle, Waynesboro, PA

Map 2



United States Geological Survey, 7.5 min quadrangle, Waynesboro, PA

Map 3



United States Geological Survey, 7.5 min quadrangle, Waynesboro, PA

SOLUTIONS

Exercise 1

a. 0.78 miles from A to B
b. 8,400 feet from A to Springs
c. 0.87 kilometers from Library to B

Exercise 2

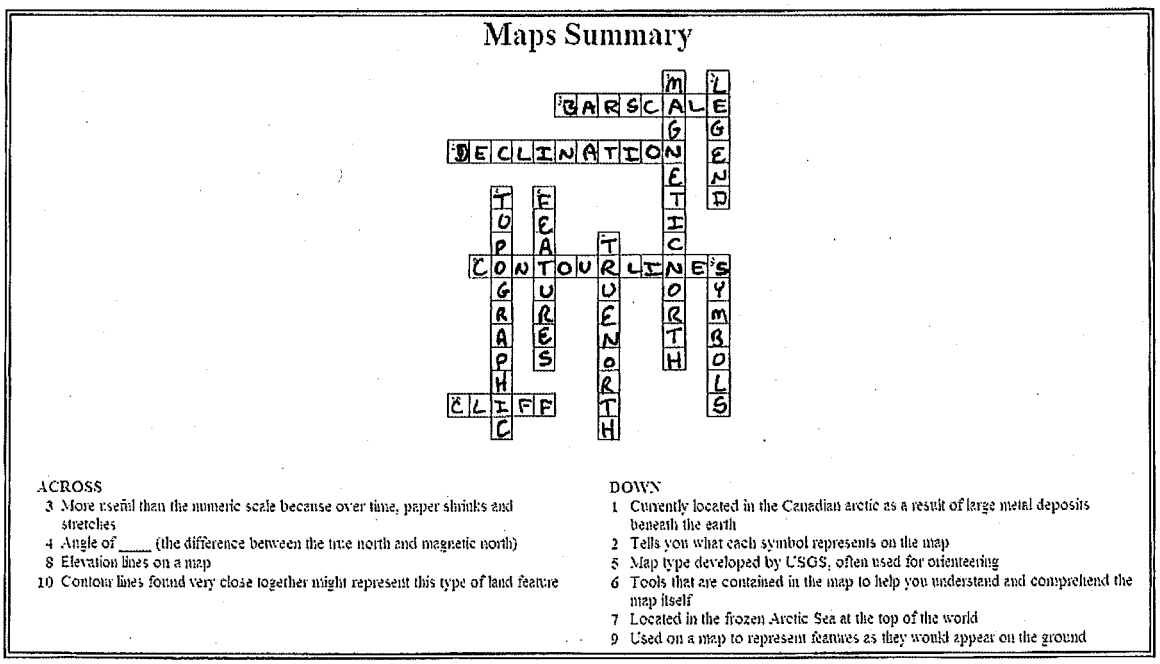
a. #2
b. #3
c. #5
d. #1
e. #4

Exercise 3

A. u contour
B. peak
C. sinkhole/depression
D. steep slope
E. pass/saddle
F. gradual slope
G. v contour

Exercise 5

The angle of declination is 10°.



Exercise 8

a. 286°
b. 77°

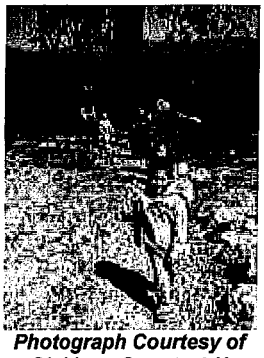
CLOVER SAFE

AGRICULTURE AND NATURAL RESOURCES
ENVIRONMENTAL HEALTH AND SAFETY

#21

HIKING SAFETY

Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.



Photograph Courtesy of Siskiyou County 4-H Program

4-H members participate on hikes that take place in terrain ranging from relatively flat land to steep, rugged topography and from wetland to desert conditions. Precautions to prevent injuries vary somewhat depending on the type of terrain and habitat encompassed by the path of the hike.Common injuries that are related to hiking include strains, sprains, cuts, bruises, insect bites, and sunburn. By taking several simple precautions and becoming familiar with the area and path to be hiked, 4-H members can control and/or reduce exposure to conditions that may cause injuries.

The following precautions should be followed to reduce the potential for incurring hiking-related injuries:

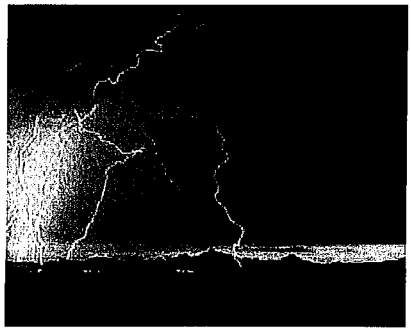
- Good safety practices are to (1) tell someone (that is not participating) the hiking route and when the hikers should return or complete the hike, (2) hike with a group or partner in remote areas, (3) bring adequate water for the weather conditions, and (4) carry a first aid kit and cell phone or other communication device while hiking.
- When possible, know the route(s) you will be taking during your hike. Carry a reference hike-route or -location map, if necessary.
- In case of an emergency, know how to direct emergency responders to your location or transport an injured person to the closest medical facility.
- Do not wander from your hiking group or partner.
- If you notice that a member of your hiking group is missing, immediately notify your project leader, parent, or guardian.
- Always treat hilly and mountainous topography with caution. Carefully pick the spots where you intend to step. Be careful of dislodging rocks onto other hikers below or following you.
- Walk carefully in uneven terrain, especially when the ground surface may be obscured by vegetation or during twilight or at night.
- Dress appropriately for the weather conditions and hiking path terrain: as necessary wear a hat, long pants, boots or sturdy shoes, jacket, and skin and eye protection (i.e., sunscreen and sunglasses).
- Use insect repellants containing compounds such as DEET (repels insects) on exposed skin and permethrin (kills many insects on contact) on clothing only.
- Rock climbing without proper experience or equipment is dangerous and ill advised.
- Always be aware of potential temperature extremes associated with the hiking path and area. Dress appropriately for extreme temperatures that may cause heat or cold stress.
- Be particularly alert for falling rocks, rock slides, or rock falls when hiking in proximity to cliff faces or steep rock outcrops. Wear a safety hat when hiking in areas where falling rocks are common.
- When hiking in wet areas or in proximity to water, beware of stepping onto slippery rocks, slopes, or ground.
- When hiking in wetland areas, be cautious of stepping onto unsupported vegetation, soft mud, or quicksand. Use a pole or branch to probe the path surface ahead of you when crossing wetland areas.
- Be conscious of tidal cycles when hiking in coastal and estuarine wetland areas. Consult tide tables or similar reference materials and plan your hike accordingly.
- Whenever a lightning threat becomes apparent, move to a low spot and seek shelter immediately.
- If you encounter a snake, remain calm and back away slowly. Always give snakes plenty of room to escape from you. Never approach, tease, corner, or poke at any snake.
- Closely look for snakes or insects before placing your hands on objects such as rock outcrops or trees or picking up objects from the ground (i.e. rocks, plants, leaves, etc.)
- Thoroughly inspect the area where you intend to sit, particularly around stumps, logs, boulders, or rock outcrops.
- If you experience an insect bite or sting, wash the wound with soap and water, apply an antiseptic, and cover the wound with a band aid or clean dressing. Carefully remove stingers from skin by using tweezers and then clean and dress sting wounds. Never scratch an insect bite or sting.
- Promptly seek professional medical attention if you suspect you are experiencing severe venom allergic reaction symptoms.
- If a snakebite occurs: calm the victim, wash the area of the bite with soap and water, apply a cold dressing over the bite area, and immediately transport the victim to the closest medical facility for professional treatment. Also, remove jewelry, watches, and tight clothing in preparation for tissue swelling.

CLOVER SAFE

AGRICULTURE AND NATURAL RESOURCES
ENVIRONMENTAL HEALTH AND SAFETY

#35
THUNDERSTORM SAFETY

Clover Safe notes are intended primarily for 4-H volunteers and members nine years and older.



According to information available from the National Weather Service, approximately 1,000 people are struck by lightning in the United States each year. In addition, lightning caused 490 fatalities nationwide from 1995 through 2004. Of this total, approximately 50 percent of the lightning deaths occurred outside in open areas and about 16 percent of the fatalities happened when people stood under trees that were hit by lightning. Lightning from thunderstorms is a dangerous threat to people outdoors if they are in proximity to the storm.

The following precautions and actions should be taken to reduce the potential for being struck or seriously injured by lightning:

- Be aware that if you are within hearing distance of thunder, you are also within striking distance of lightning.
- If you see lightning and hear the resultant thunder in less than 30 seconds, the thunderstorm is within six miles of you and should be considered dangerous.
- Whenever a lightning threat becomes significant, seek shelter immediately.
- Sheltering from lightning includes returning to a vehicle, vacating ridge or hill tops and open water bodies, and occupying buildings or facilities.
- If you are able to shelter indoors, unplug and keep your distance from appliances, computers, radios, and television sets.
- Never stand under an isolated tree in an open area to shelter from a thunderstorm.
- During a thunderstorm, avoid contact with metal objects such as fences, poles, electrical wires including overhead utility lines, machinery, and power tools.
- It is not a safe practice to take refuge from lightning beneath canopies or small picnic or rain shelters.
- If you are caught in the open during a thunderstorm, crouch down and protect your hearing by covering your ears. If possible, crouch down in a nearby topographic depression or low spot.
- If someone is struck by lightning, immediately contact 911. Know how to direct emergency responders to the injured person's location.
- If the victim of a lightning strike is unconscious, check their airway. As necessary, start CPR and apply other first aid measures.
- Wait at least 30 minutes after a thunderstorm has passed before resuming outdoor activities.

I'm a 4-H Project Leader: Now What Do I Do?

How do I know who is in my project?

- Your club organizational leader will provide you with the names, addresses and phone numbers of the members enrolled in the project for which you are the leader.
- If you are working on the county level, contact the UCCE for the list of project members.
- The organizational leader may indicate to you if any of the youth have special needs. At your first project meeting, note any other youth that may have special needs.
- You may wish to consult with the parent or your 4-H Youth Development Agent as to how to work with a special needs child.

How often should I hold project meetings?

It is recommended you hold 4-6 meetings that each last 1½ to 2 hours in length. Some projects require more meetings or a longer meeting time to accomplish your goals. Some projects, such as leathercraft, may lend themselves to individual project work as members progress on their projects. In this case, you should hold several introductory meetings for all members and then set up a schedule of time for them to sign up for individual help.

When do I start?

Get started as soon as possible! Members' interest in a project is most keen when they are signing up for a project and when they get their project books.

How do I cover the cost of project meetings?

- There is a wide variety of means for covering the cost of project meetings. Some methods used include:
- Each member pays for their share of the expenses or provides a portion of the supplies.
- The club agrees to cover expenses using funds from their treasury. Approval in advance is needed for this.
- Members and leaders can solicit donations/supplies from area businesses.
- Sometimes funds from sources outside your club may be available to cover your project meeting costs.

How do I establish a project meeting schedule?

First, determine when you are available to work with project members. Then determine an initial project meeting date by consulting with your project members.

Thanks to 4-H Youth Development Programs, UW-Extension, Cooperative Extension for use of these materials.

Publicize the date using one of the following means:

- County and/or club newsletter
- Club meeting or leader association meetings
- Postcards or phone calls to project members

You may not be able to schedule an initial meeting that everyone can attend. Establish a time to meet with those unable to attend before you hold your second project meeting.

Where do I hold project meetings?

Typically project meetings are held at project leader homes, schools, or community buildings. For more information on facility adaptability and liability concerns contact your 4-H Youth Development Agent.

What safety precautions do we need to consider?

Consider the type of safety issues your particular project involves. Request and secure necessary safety items such as ear protection, eye protection and head protection.

How do I let others in my club or other clubs know I am a project leader?

Prior to enrollment ask for time on your club's meeting agenda to let families in your club know you're a project leader and to share some things the kids could do in the project if they enrolled in it. When the project materials are handed out, take the opportunity to inform or remind members that you are their project leader and set an initial meeting date with the group. If no one in your club is in your project, you may wish to offer your services to a neighboring club. Talk to your club organizational leader or county 4-H Youth Development agent about this opportunity.

How do I prepare for the first meeting?

You may want to establish a 4-H resource box where you keep your project materials and any additional resources you will be using. Take time to become familiar with your project literature and talk to others who were project leaders for this project to find out what activities the members enjoyed.

What should I do at the initial project meeting?

- At the initial project meeting, here are some ideas of what you might want to cover:
- Find out what the members want to learn and accomplish in the project. The project literature is an excellent source of ideas.
- Review the safety practices that members will need to follow.

Thanks to 4-H Youth Development Programs, UW-Extension, Cooperative Extension for use of these materials.

- Do an introductory activity related to the project so the members get to know one another
- Have a small project the members can complete and take home
- Talk about how the project meeting supplies will be paid for. Experienced leaders have found it easiest to charge a small fee to cover the cost of the expenses.
- Assess when members are available for additional meetings. You may wish to ask the parents or members to bring along their calendars of family activities.
- Encourage parents to participate in project meetings, especially the initial meeting.

What does a typical project meeting look like after the initial orientation?

Use the experiential learning model (found in the introductory pages of your Helper's Guide) to plan your project meeting. The project helper's guide will provide suggestions for designing a project meeting. Here are some suggestions for each section of the model:

Do

- Plan an activity to focus the project members on what they'll be doing today. Work on the project for that meeting.

Reflect

- Review the process completed
- Discuss what worked and didn't work.
- Talk about how any problems that arose were solved.
- Assist members in documenting their project work for inclusion in their record books/portfolios.

Apply

- Ask the project member the following questions:
- What else have you seen that is similar to this?
- How can you apply what you learned today to other situations?

What resources are available to help me?

- 4-H Project Literature – You will receive project literature through your 4-H club or the UW-Extension office. Typically there is a helper's guide and member literature for three to four levels.
- Other People in my Club & County – There are a number of people in your county who would be willing to share project ideas and tips with you.

Thanks to 4-H Youth Development Programs, UW-Extension, Cooperative Extension for use of these materials.

These include:

- Project leaders in other clubs
- County Staff
- Older youth who have been involved in the project

- Media Collection & Public Libraries – Additional resources can be obtained from the Cooperative Extension Media Collection. They have videos, skillathons, displays and resource packages available to support a variety of projects. There is a user fee per item you or your club will be responsible for. You can view their catalog at their website http://www.uwex.edu/ces/media/. Check with your local public library to find out what resources they may have or that you can obtain through inter-library loan.
- 4-H Website – Wisconsin 4-H is continually adding more information and activities to their website. Visit this site at www.uwex.edu/ces/4h/onlinepro/. You may wish to check out websites from other state 4-H programs also.
- Volunteer Leaders Conferences – Review each issue of your county's newsletter to learn about training sessions for project leaders offered by your county, district or at statewide events. Sessions focusing on new project literature are typically offered at the State 4-H Volunteer Leader Conference held every other year. Periodically statewide conferences focusing on specific project areas are offered in addition to sessions at the volunteer conferences. You can also exchange ideas with other leaders at statewide Field Day.
- Field Trips – Youth always enjoy the opportunity to see firsthand how things are done and how they work. Consider taking your project group on a field trip or tour of a local business or company to enhance their project experience. An example would be taking your dairy members to a cheese factory or your foods group to a local bakery.
- Local Experts – Bring in a local "expert" to share their ideas and experiences with your group. One example would be asking a Master Gardener to share information on choosing perennial or trimming shrubs at one of your project meetings.
- Magazines – Many leaders have found creative ideas to supplement those in the project literature in magazines they have or those at the public library.

Thanks to 4-H Youth Development Programs, UW-Extension, Cooperative Extension for use of these materials.

How can I incorporate activities not included in the project guide?

We encourage you to use the ideas in the project literature as they have been successfully used with youth. If you have some additional activities you would like to incorporate, consider the following criteria:

- Of interest to kids
- Developmentally appropriate
- Incorporate the experiential learning model
- Youth and adults are involved in determining what will be done
- Enhances the development of member life and project skills
- Research based source of content utilized

What is the relationship between project work and the county fair?

The County Fair is an opportunity for an independent evaluation of life and project skills a member learned through completing a project. County fair entries typically match the activities included in the project literature and may include other activities that are being emphasized in your county. One of your roles is to help maintain the focus of members and parents on the goal of 4-H, which is to develop blue ribbon kids. Talk with members about what they learned about each of their fair entries from the judging process. Help members celebrate their accomplishments regardless of the color of ribbon each project member received at the fair. This may be done through individual encouragement or at a meeting following the fair. While entering and displaying a project at the County Fair is the traditional method of public affirmation, there may be other means of exhibition such as a club tour, open house, community celebrations or others.

Who can I go to if I need someone to help me during the project meetings?

If you are leading beginning level project meetings, ask older members in the project to help you. This is a great leadership experience for them! Parents are another excellent source of help. Don't hesitate to ask them to stay for the meeting and be actively involved in their child's project work.

Thanks to 4-H Youth Development Programs, UW-Extension, Cooperative Extension for use of these materials.