

# NAVIGATION

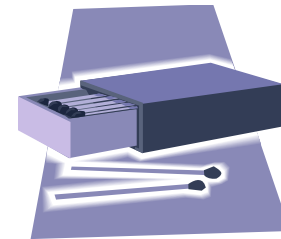
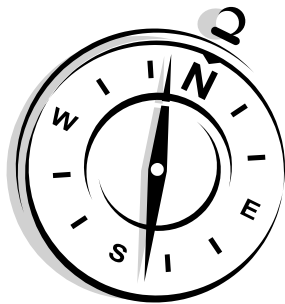


Navigating in unmarked or poorly marked terrain  
Advancement Module 04  
Dallas CERT



- This unit provides:
  - Methods for navigating without a map
  - Using a map to navigate
  - Preparation for navigating in an unmarked disaster scene
  - Mental preparation for being lost

- CERT team members should consider carrying a compass in their kit
- Other basic equipment should include a knife and matches
- Complete this unit to be prepared to navigate on your own or with a team



# Compass

# Types

- Lensatic



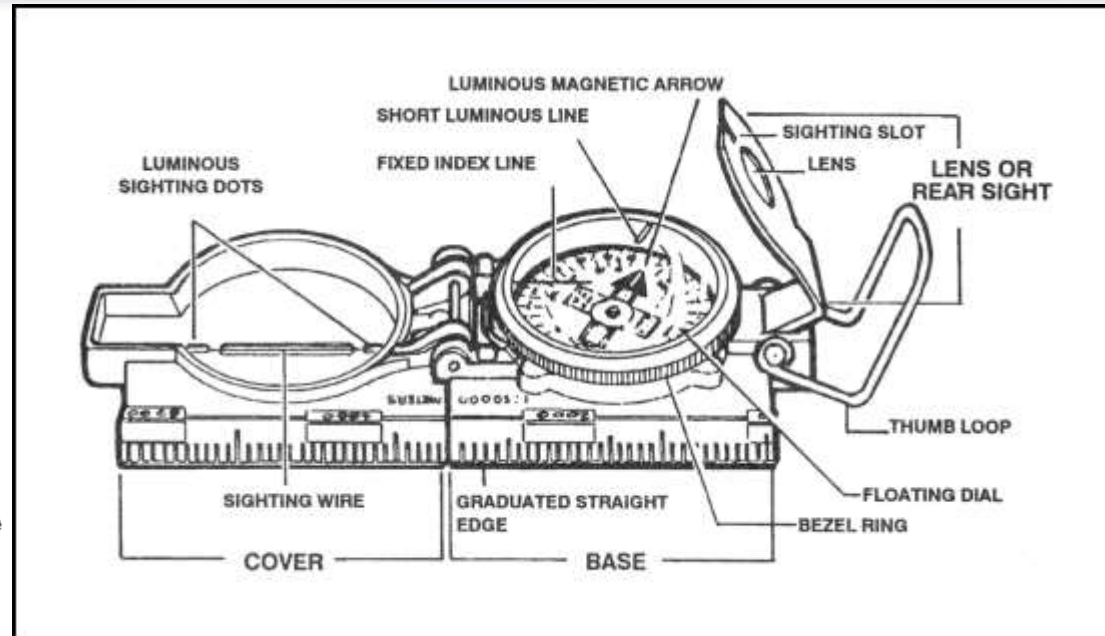
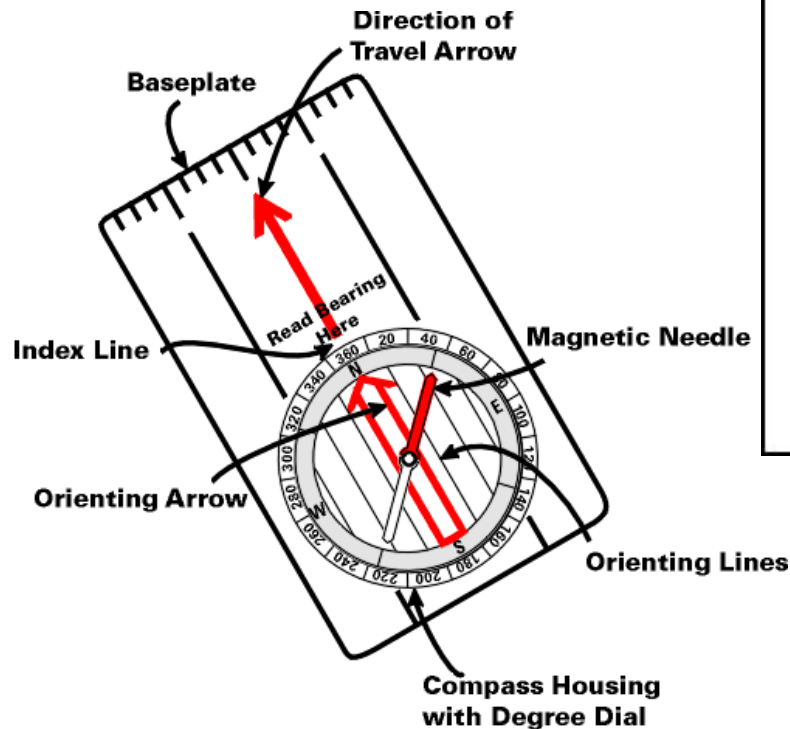
- Base Plate





# Compass

## Parts



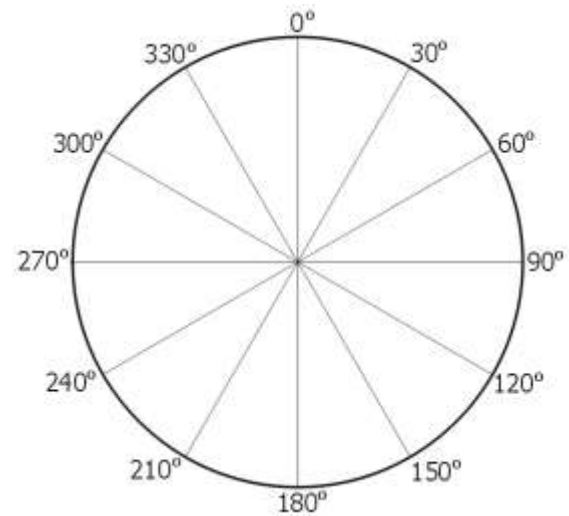
“Good” compasses are typically liquid filled

# Compass layout

A compass is based on a circle divided into 360 degrees.

These degree divisions are used as a notation to describe directions in relation to North.

On a compass, North is at zero degrees, East is at 90 degrees, South is at 180 degrees, and West is at 270 degrees.



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# Compass

## Taking a bearing-baseplate

- Hold the compass level and point the **direction of travel arrow** at a landmark that is in the direction you need to go
- Rotate the compass until the **orienting arrow** lines up with the **needle**, pointing to the North
- Sight along the **direction of travel arrow** in the direction of the landmark and note the degree mark on the compass that corresponds to that direction – that is your “bearing”



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# Taking a bearing

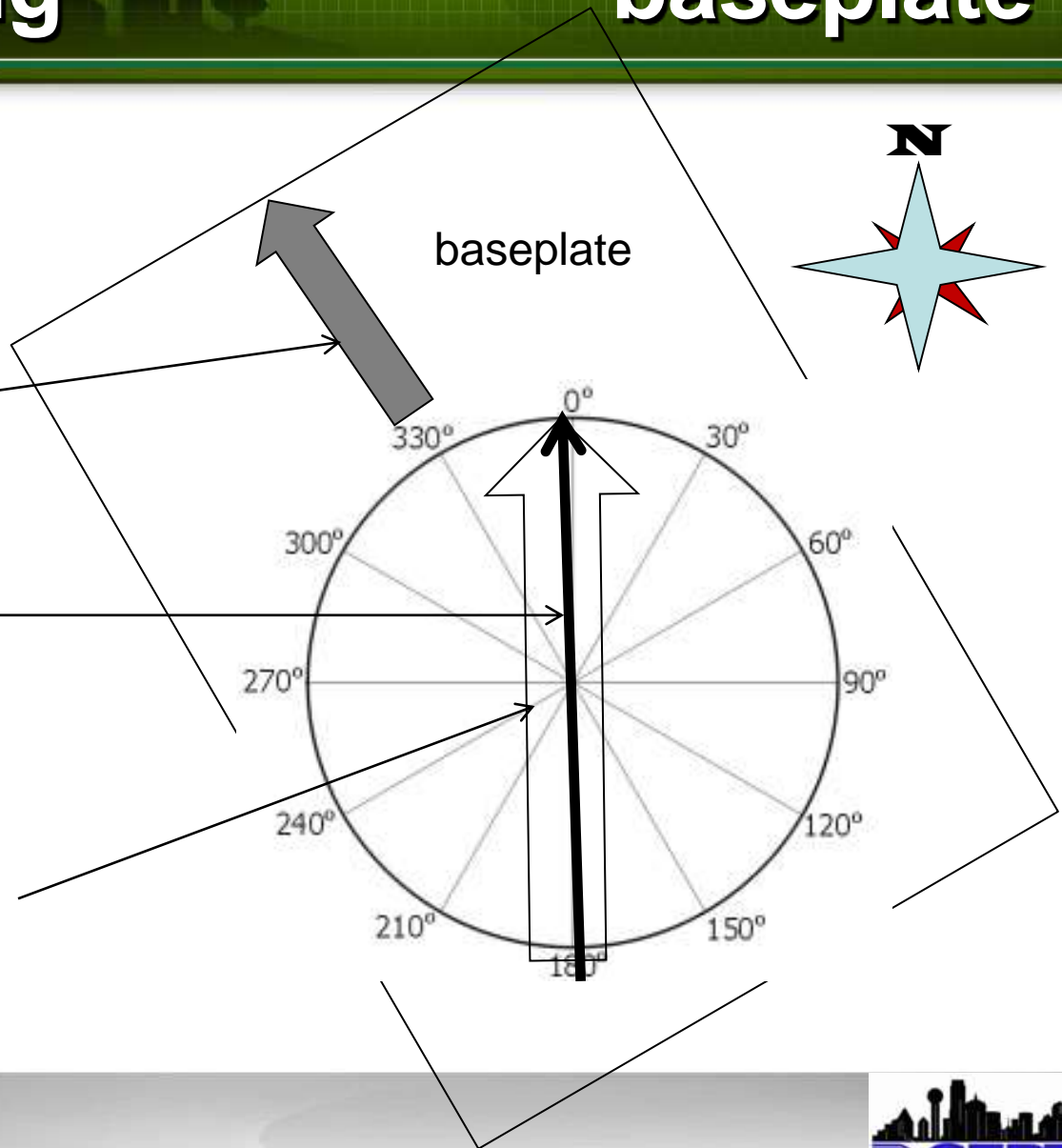
baseplate

This diagram illustrates a bearing of 330 degrees

Direction of travel arrow

Compass needle

Orienting arrow (which is part of the dial on the compass)



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# Taking a bearing

## lensatic

- With the Lensatic – set the arm with the small lens so it leans at about a 45% angle with respect to the base of the compass.
- Line up the small slot in the arm with a) the hairline in the compass top and b) the object in the distance you want to navigate to;
- peek through the lens at the dial and note the degree reading – that is your bearing.



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Take your compass and go outside, away from cars and metal objects

- Taking a bearing with a **Lensatic compass**  
or
- Taking a bearing with a **base plate compass**



- As you progress on your travels, check every so often to stay on the same degree bearing from North that you started with
- Use time or paces to measure the distance traveled

# Uses for compass readings

- In a disaster site a compass reading would be useful for:
  - Understanding street patterns
  - How the path of a tornado is oriented
  - Orienting a map to the area
  - Describing locations to other responding agencies and operators

- Typical map symbols:
  - ❖ Buildings – solid black with square corners
  - ❖ Roads – regular solid or hollow smooth lines for main roads
  - ❖ Streams – meandering lines;
  - ❖ Water – irregular closed figure, usually blue
  - ❖ Green overlay – wooded areas
  - ❖ Bridge – double-ended funnel
  - ❖ Contour Lines – show elevation; how close together they are indicates the acuteness of the slope
- The top of the map is usually the North end



- Maps are produced in a variety of scales: a scale is the ratio of the map size to the real space depicted.
- Commonly maps useful for navigating are produced in 1:24,000, 1:25,000 and 1:10,000 scales – the smaller the number the closer the view of the area



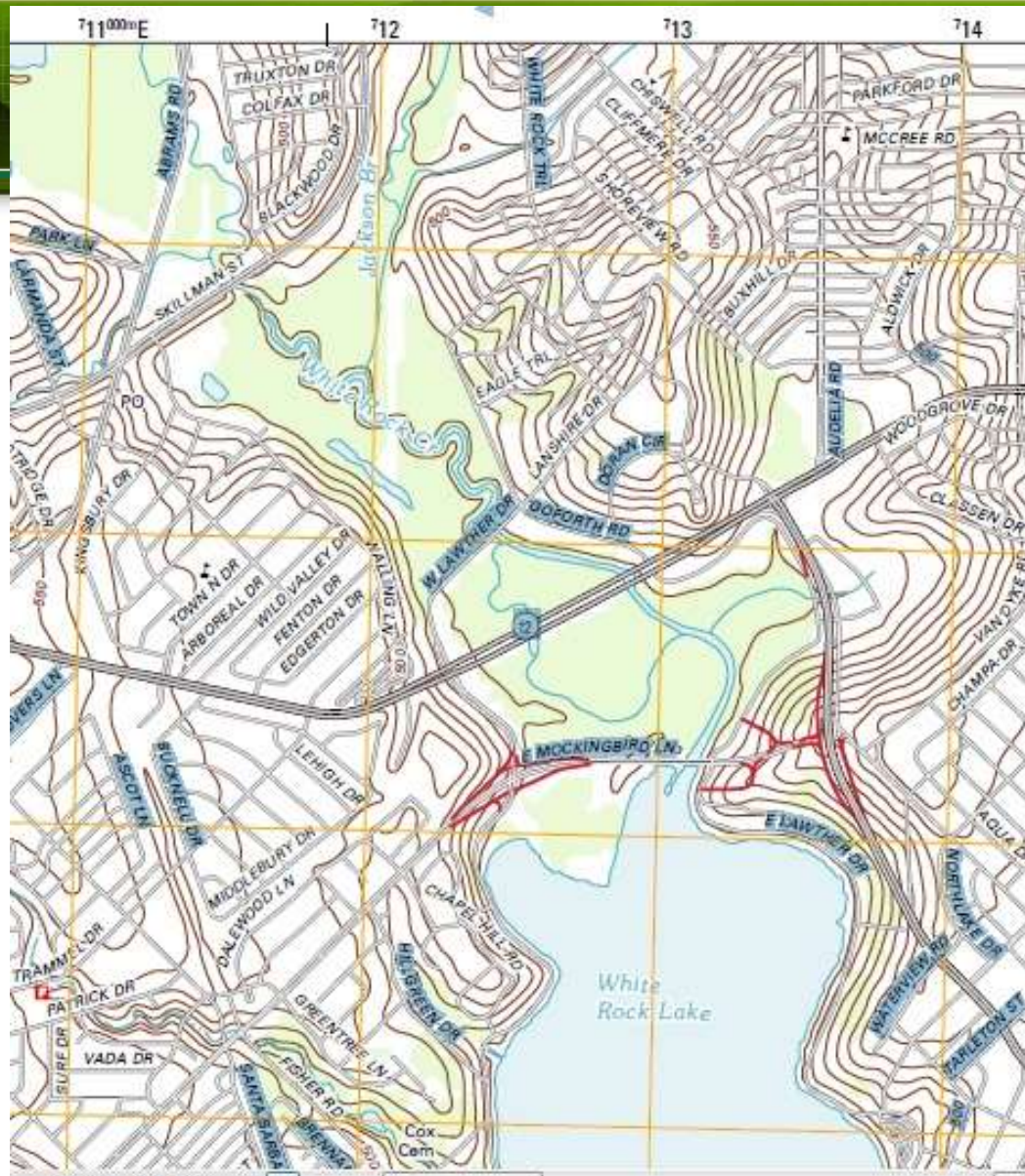
- USGS - <http://store.usgs.gov>
- <https://www.kappamapgroup.com>
- [www.rei.com](http://www.rei.com)
- Most outdoor gear stores
- *May be issued by emergency management agencies for deployments*

# Maps -- Sample

This sample shows the area in Dallas at the North end of Whiterock Lake. The area just above the “T” intersection is known as Flagpole Hill and you can tell it is a hill by the closely spaced contour lines.

Other depictions to note include the waterways in blue and the wooded areas in green. The small square with a flag near McCree Rd at the upper right shows the location of a school.

This map is scaled at 1:24,000 or 7.5 minutes.







- The first step in using a map is to orient it with a compass so that North on the map is the same as North on the compass
- Second, look around and match landmarks or land forms with their depiction on the map
- Choose a location to head toward and take a compass bearing for that point

# Measuring distances

- Know your stride

- Measure a space on flat ground (a sidewalk) of 50 or 100 feet
- Walk that distance in your normal stride, noting the number of times one foot touches the ground (the strides)
- Divide the length of the course by the number of strides to get an average stride length



# Measuring distance

- Everyone's stride or step length varies due to our different leg lengths and heights. The average is taken as 2.2 feet for a woman and 2.5 feet for a man. Work out yours to see how close you are to the average.

Another way you can estimate your step length  
Women = height x .413 equals your step length.  
Men = height x .415 equals your step length.

# Measuring distance

- Average number of steps (that is the distance that is travelled forward by just one of your legs.)  
500 steps =  $\frac{1}{4}$  mile,  
1000 steps =  $\frac{1}{2}$  mile.  
2000 steps = 1 mile  
10,000 steps = 5 miles
- Add knots to a string or rope to keep track of the miles you have gone; get fancier and use ranger beads or a tally counter

# Measuring distance

## Ranger Beads

- Beads are arranged in two section on paracord – a lower section with 9 beads and an upper section with 5 or more beads.

- Sliding the beads up can be used to either count strides or the number of yards traveled.



# Measuring distance

## Hand counter



A hand tally counter will count up to 1000 and can be reset by turning the knob on the side. Most counters weight only a few ounces and take up little pack space.



# Measuring distance

## Ranger Beads

- ***Distance walked method*** (you must know the number of strides you make in 100 feet):
  - Every 100 feet pull up one of the beads on the lower section. After the 10<sup>th</sup> time, pull all the lower beads down and pull up one of the beads on the top section.
- ***Example*** – I make 45 strides in 100 feet; every 45 strides, one bead gets pulled up



# Measuring distance

## Ranger Beads

- **Counting paces method:** Slide one bead up on the lower section for every 10 strides, on the 10<sup>th</sup> increment the lower beads are all slid down and one upper bead is pulled up.
- **Example:** After 2 upper beads, the person has gone 200 strides. If their stride length is 2.3 feet, then they've gone:

$$200 \times 2.3 = 460 \text{ feet}$$

**Hint:** a mile = 5280 feet

*(or 23 upper beads for this particular person)*

# Measuring distance

## Activity

- Find a place where you can measure a distance of 100 feet
- Walk the distance, noting the number of steps (if you note the steps on both feet, divide by 2)
- Divide 100 by the number of steps
- Example:  $100/48 \text{ steps} = 2.08 \text{ feet per stride}$



- What to do if lost
  - Assess your resources and environment
    - ❖ Availability of water and means for shelter
    - ❖ Threats – fire, animals, insects, weather
  - Decide whether it is better to stay put or move
  - Find a safe location
  - Avoiding panic in unfamiliar situations
  - Make a SAFE fire and put out signals

- Season yourself ahead of time
  - What panics you?
    - ❖ Being alone
    - ❖ The unknown
    - ❖ Darkness
    - ❖ Lost equipment
    - ❖ Tight spaces
    - ❖ Heights
  - Silently think about taking a few calming breaths when faced by one of these

# If Lost



- Understand that it will take real effort on your part to be rescued or find a way out
- *If you are in a position that others probably know where you are or if you are near a vehicle or building, consider staying there*
- If you must move, **follow a watercourse or a road. Leave a note** saying where you're going and **blaze a trail.**



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# Blazing a trail



- Mark tree branches with some cloth, tape, or string
- Make a cairn (pile) of rocks, then leave a single rock on the side of the pile in the direction you are going
- Stand a stick in the ground then attach other sticks to point in the direction you are going



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- Finding compass points (northern hemisphere)
  - A crude way to find “North” is to plant a fair sized stick in a vertical position
    - ❖ At fifteen minutes before noon, note the position of the tip of the stick’s shadow (maybe put a rock or peg there)
    - ❖ At fifteen minutes after noon, note the position of the tip of the stick’s shadow
    - ❖ North will be half way between the two points

# In a disaster scene

- Before you enter the scene, pick out the best available landmarks as reference points. Since vertical landmarks may be erased, look for landforms and use your compass. Make a diagram, even if you have to use a shirt or the back of your glove.
- When you enter the scene, look back occasionally to see what the path will look like coming back
- Blaze a path, using triage/marking tape, chalk marks, or a lumber crayon



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# In a disaster scene

- Be careful about crossing elements in the landscape such as waterways or major roads that may cause confusion if you cross them again further on; add them to your diagram
- Use distance measuring tools – auto odometer, personal paces, time



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- Compass
- Map of the area
- Notebook and writing instruments
- Radio or cell phone
- Spare batteries or solar charger
- Knife
- Matches
- Whistle





- Pedometer
- Binoculars or telescope
- Ruler
- Handheld GPS
- Clipboard
- Automobile GPS

# Places for more info

- <http://www.rei.com/learn/expert-advice/navigation-basics.html>
- Or – [www.rei.com](http://www.rei.com)
- Youtube
- [http://www.backpacker.com/backpacking\\_101\\_understanding\\_your\\_compass/skills/12159](http://www.backpacker.com/backpacking_101_understanding_your_compass/skills/12159)



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# Navigation



Be prepared and good luck!



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# Navigation

Almost done,

Now, Please take the quiz by  
clicking on this link:

[NavQuiz](#)



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