Layering for Hiking & Backpacking

- Layering is a very effective way to regulate your body temperature during changes of weather conditions as well as changes of activity level.

- Adding layers when weather conditions get cooler, or when your activity level is lessening.

- Removing layers when weather conditions warm up, or when your activity level is increasing.

- Clothing with zippers allow you to “vent” away heat, which can be a faster adjustment as opposed to removing an entire layer.

- Layering also helps insulate you from the cold by creating “dead air space”, which is a layer of static, unmoving air which is heated by your body.



The challenges when layering

•There are many different materials that do similar things, and new materials and weaves are constantly being created.

•There are choices between synthetic materials, natural materials and blends of the two.

•There are materials left in their natural state as well as materials that are chemically treated to aid with moisture control.

•Manufacturers not only provide **different materials** for layers, manufacturers provide **different thicknesses** for different weather conditions and different body types. Some people run hot while some run cold.

•In the winter you want tighter fitting layers to help with moisture control, you want the layers (especially the base layer) to fit snug so it can absorb perspiration and“wick” it away.
In the summer you want loose clothing to help with ventilation.

•Regardless of weather or body type (running hot or cold), the general principle of layering remains the same, what changes is the thickness/loft of the layers and the combination of layers (or lack there of).

Heat Loss Mechanisms

It's important to understand how your body looses heat when deciding on what to wear for your outdoor adventures. In winter you want to prevent this heat loss. In summer you welcome the heat loss.

CONDUCTION: Heat travels from a warmer object to a cooler object. An example would be sitting on a cool rock. The heat travels from your warm butt to the rock and soon your butt will feel cold and your body starts to cool. This is why we use a sleeping pad between us and the ground (tent floor), is not just for comfort, it insulates us from the cold ground preventing body heat loss through conduction. Conduction occurs 25-Times faster with wet clothing than with dry.
WINTER - Thick Layers
SUMMER – Thin Layers

CONVECTION: Your body keeps a warm layer of air next to the skin. Wind displaces this air, thus cooling you. This is why at the same given temperature, you are cooler on a windy day when not wearing wind stopping garments.
WINTER - Windproof Garments
SUMMER - A breeze can help cool you

Heat Loss Mechanisms…Continued

RADIATION: The transfer of heat, through electromagnetic waves from the body into space.
Exposed skin is the main culprit of radiative heat loss, head, face and neck.
WINTER - Thick, sometimes multiple layers, cover up your head, neck and face.
SUMMER - Less clothing can encourage radiative heat loss but watch for Sunburn.

EVAPORATION: Your body tries to remove moisture on your skin via evaporation. It takes energy to change a liquid to a gas which draws heat from your body. This is why even on a hot day, you feel chilled when you get out of a pool.
WINTER - Minimize sweating, remove layers when active, wear moisture wicking fabrics to move sweat away from your skin.
SUMMER - Sweating helps you cool off. Cotton clothing can hold moisture which can aid you in staying cool via evaporative heat loss.

Clothing Materials

There are a several different materials available that act in a similar manner, they move perspiration away from your body to the outside of the garment where it can be more easily evaporated away. Manufacturers seem to be continually bettering “active wear” products with new technology and wicking fabrics.

There are synthetic “wicking” fabrics such as Polyester or Polypropylene that do not absorb water nearly as much as cotton. These fabrics are worn directly against the skin to move moisture away from your skin to the outside of the fabric where the moisture can be more easily evaporated.

Clothing Materials…Continued

Some fabrics also contain chemical components. The layer nearest the skin may be "Hydrophobic" (Water Hating), helping direct water away from the body.
The garment's outer surface may instead be "Hydrophilic" (Water Loving), drawing moisture toward the outside. For proper performance, these garments should not be worn inside out.

Other fabrics rely on "Capillary" action to move moisture from the skin toward the outer surface of the garment.

Merino Wool uses finer, "non-itchy" fibers and is antimicrobial, which helps limit odor-causing bacteria. Wool can absorb about 30% of its weight in water while continuing to provide insulation because dead air remains trapped within the fabric.

Merino Wool is sometimes branded as "Smart Wool"



Clothing Materials…Continued

Moving perspiration away from your skin is vital in cold weather conditions since **water conducts heat away from the body 25 times faster than air**

In Cold Weather:
A tight fitting base layer will wick moisture away from your body,
this will keep you dry and avoid rapid cooling.

In Warm or Hot Weather:
A loose fitting base layer will provide some extra ventilation,
this will help keep you cooler.

The “4 Tier” Method of Layering

Each of the 4 tiers should be adjusted to your environment and the season you are hiking.

For example, the base layer for a summer hike in St.George will be much lighter and thinner than a base layer used on a winter hike in Alaska.

Your body may run warmer or cooler so the weight of a given garment in a particular environment may differ from person to person.

Some outdoor clothing manufacturers use a “system” to indicate the weight (warmth) of their clothing.

An example: Silk Weight / Light Weight / Mid Weight / Heavy Weight.



Wicking Base Layer:

A moisture wicking layer directly against your skin. (Traps warmth, wicks away moisture).

Materials: Merino Wool, Silk, Polyester, Nylon (or other Synthetic Material)

Weight: Dependent on your environment and your body type. (See Next Slide)

Top: Short or long sleeve undershirt (crew neck or 1/4 zip)

Bottoms: Wicking long John's, briefs or boxer underwear (not as critical as your top due to body core, however, more necessary in very cold conditions or as sleeping clothing)

Note: Your base layer can double as your sleeping clothes.

Base Layer Guide:

Men's Baselayers



COLDPRUF
TECHNICAL FIBER™
WITH SILVADUR™ INTELLIGENT FRESHNESS

ColdPruf technical fiber with SILVADUR intelligent freshness is a high-performance base layer fabric engineered to wick moisture, insulate in cold environments, and actively block odor-causing bacteria.

ColdPruf Men's Platinum II
A heavyweight, two-layer base layer with a **70% polyester/30% merino wool exterior and a 100% technical polyester interior** featuring SILVADUR™ odor control. Its air-trapping construction provides superior warmth for extreme cold and medium- to high-activity adventures.

ColdPruf Men's Journey
A lightweight, **single-layer fleece** base layer made from 100% technical polyester with SILVADUR™ odor control for moisture-wicking and quick-drying performance. Its regular fit makes it ideal for cold to very cold conditions and medium- to high-activity adventures.

ColdPruf Men's Performance
A single-layer jersey-knit base layer made from **96% technical polyester with SILVADUR™ odor control and 4% spandex** for added stretch. Its close athletic fit and moisture-wicking performance make it ideal for medium- to high-intensity activities in cold to very cold conditions.

Base Layer Guide:

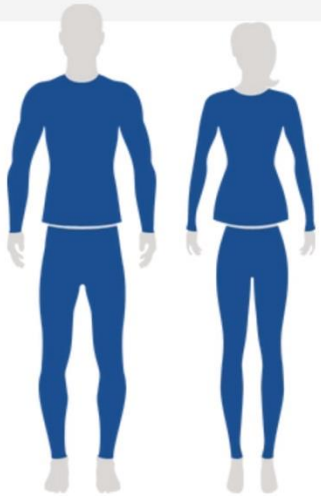
Weather	Activity level	What you need
Cold - Very Cold Weather	Low - Medium Activity	2 layer construction and a cotton/polyester blend. SHOP NOW
Cold - Very Cold Weather	Medium - High Activity	Single layer engineering, moisture wicking and anti-microbial technology. SHOP NOW
Very Cold - Extreme Cold	Low - Medium Activity	Wool based and single and double layer construction. SHOP NOW
Very Cold - Extreme Cold	Medium - High Activity	2 layer construction, lower wool percentage and anti-microbial technology. SHOP NOW
Extreme Cold	Low - Medium Activity	1 layer construction and a high percentage of wool. SHOP NOW

Base Layer Fit Guide:

Fit Guide

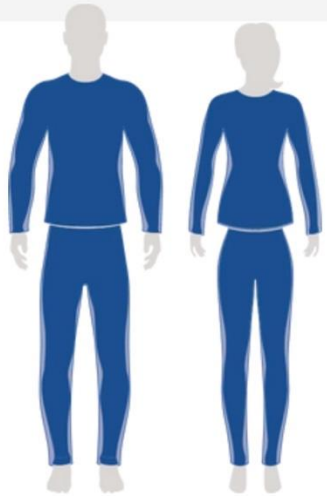
ATHLETIC FIT

A close, moves-with-you fit that comfortably conforms during activity and movement. Ideal for low-bulk layering.



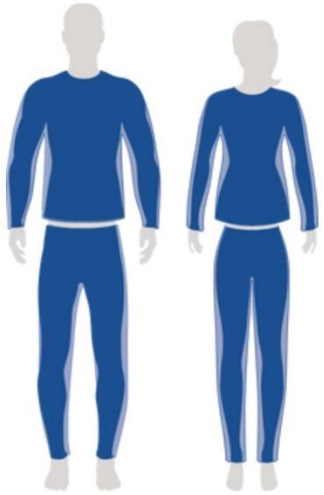
REGULAR FIT

Neither athletic or loose fitting. Provides a comfortable range of motion and allows for multiple layering options.



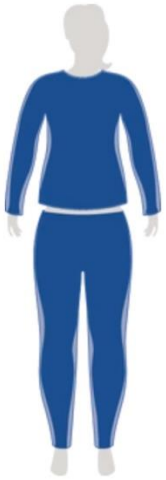
RELAXED FIT

A generous cut that fits loose on the body for full range of movement. Pant sits at natural waist or just below (women's). Good for dressing with minimal layers.



PLUS FIT

Plus size garments with TRUE plus size specs and measurements.



Active Mid Layer:

Warm layer(s) to go over your base layer

Materials: Fleece, Merino Wool (can be multiple layers in very cold conditions)

Weight: Dependent on your environment and your body type.

Top: Fleece pull-over, 1/4 zip or full zip, Merino Wool pull-over

Bottoms: Synthetic or Merino pants

Static Insulation Layer*:

Jacket insulated with poly fill or down
(Provides warmth by trapping body heat and provides insulation from the environment.)

Materials: Nylon, Puffy Jacket with polyester or down fill.

Weight: Suited to the environment conditions and your body type

Top: Down or synthetic jacket

Bottoms: Long synthetic pants / Snow Pants

**Note*: Typically used when stopped for a break or in camp, not during your hike.

Outer Shell Layer:

A shell to protect against rain and wind conditions.
Pullover, 1/4 zip or full zip jacket

Materials: Synthetic materials

Weight: Suited to the environment conditions and your body type

Top: Rain Jacket w/ hood, Rain Poncho or Wind Jacket

Bottoms: Rain pants / Rain kilt

Note: Temperature and moisture build-up can be regulated by a breathable membrane such as Goretex or eVent as well as things like “pit zips”.









Head / Hands / Feet:

Head: Sun hat / Rain hat / Beanie / Buff

Hands: Sun Gloves / Warm Gloves / Snow Gloves or Mittens

Feet: Socks appropriate for the temperature and environment (sock liners optional)

Some Scenarios:

Sunny, Warm, & Calm - Base Layer alone (sun hoodie), Light Weight Pants or Shorts

Warm & Rain - Base Layer with Shell

Warm, Dry & Windy - Base Layer with Shell (can be a wind shirt) if you feel cold from the wind.

Sunny, Calm & Cold - Base Layer with Fleece Mid Layer(s)

Cold, Windy & Wet - Base Layer, Fleece Mid Layer(s) & Shell (possibly rain / wind pants)

Very Cold, Rain (or snow) - Base Layer, Fleece Mid Layer(s), shell

Cold or Very Cold During Breaks or in Camp - Base Layer, Mid Layers, Static Insulation layer (puffy jacket)
Shell if raining/snowing.

Navigation

Not part of the Rule of 3's

• You may need to attempt to navigate your way out of your situation (assuming you are able to walk out), because:

- You never told anyone where you were going and when you plan to return. OR
- You got lost prior to your "overdue" date (if you did leave a plan with someone). OR
- You changed your route prior to getting lost, so you are lost off the planned route you left with someone.

• **This priority is best addressed** after you have accomplished all the other priorities (with the exception of food). This will allow you to:

- Have a shelter to return to if you first attempt to find your way out is not successful.
- Have signaling methods in place to use as needed
- Have a good supply of water with you

Types of Compasses:



Lensatic



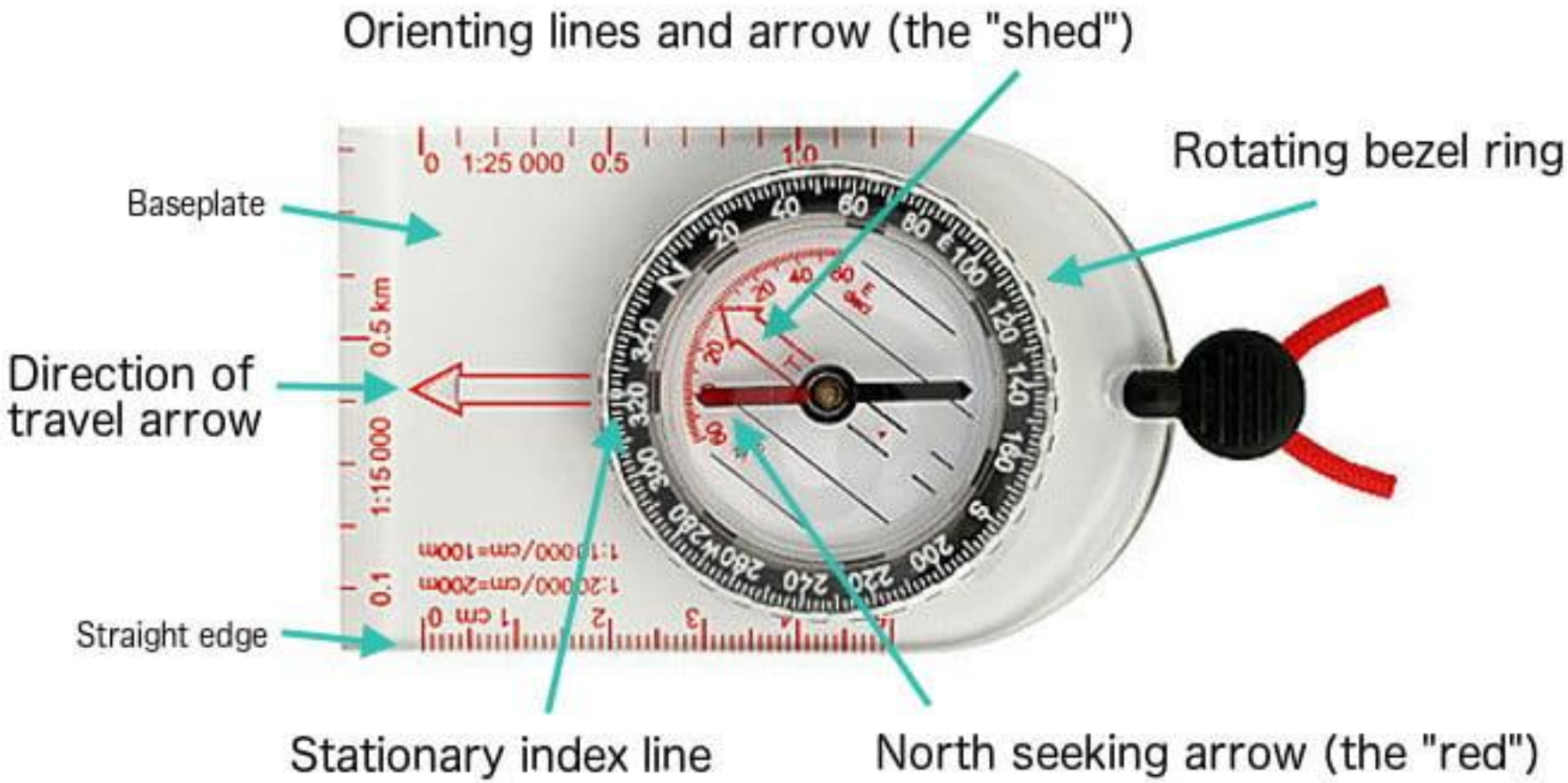
Baseplate



Sighting

Note: Compasses are set from 2 to 5 zones depending on the manufacturer (2 zones are typical).
When you purchase a compass, purchase one for the zone where you plan to use the compass.
In our area, you would simply purchase a compass for the “Northern Hemisphere”.

Parts of the Baseplate Compass:



Danger - Will Robinson
Keep Metal Objects
Away from your Compass





“Shooting a Bearing”
What direction is that object ahead?



STEP 1

Hold the compass level, and directly in front of you, with the direction of travel arrow *(The Treknor logo on the T580)* pointing to the object ahead.



STEP 2

Rotate the bezel until the North end of the needle *(usually Red)* is pointing to the "N" of the bezel *(located at the 0/360 degree location on the bezel).*



STEP 3

Now you can read your direction of travel to the object by reading the location where the bezel crosses the reading line inside the compass bezel *(243 degrees in this example).*

I know my desired direction
How do I get there?



STEP 1

Rotate the bezel on your compass until the reading line is at your desired direction. *(In this case, pretend you want to head at a bearing of 55 degrees).*



STEP 2

While holding the compass level, and directly in front of you, rotate your body with the compass until the North end of the needle (usually Red) is pointing to the "N" of the bezel *(located at the 0/360 degree location on the bezel).*

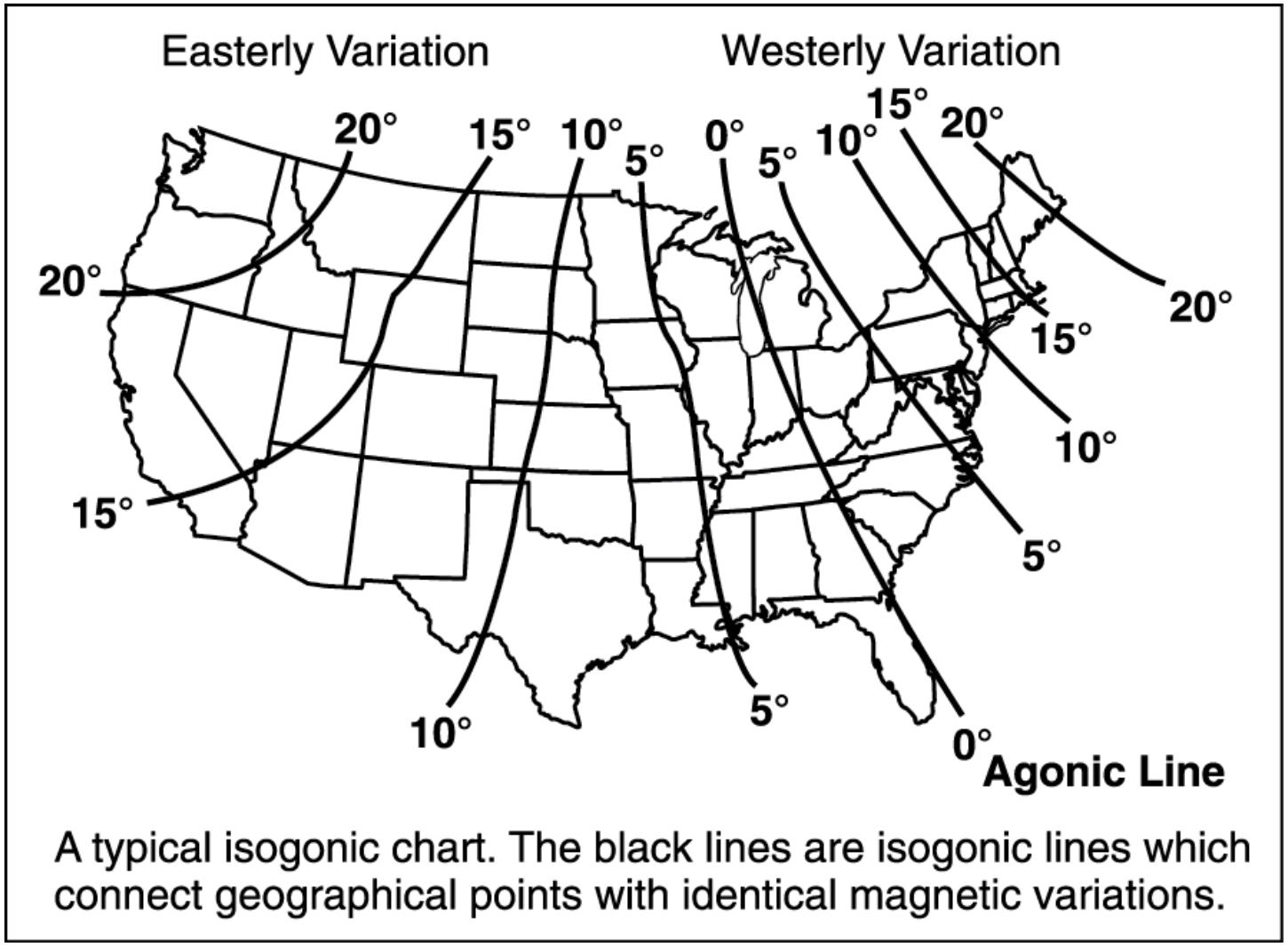


STEP 3

Now the direction of travel arrow *(the Treknor logo on the T580 Orienteer Compass)* is pointing in the direction you need to go.

Magnetic Declination (variation)

The difference between: ***Magnetic North*** (where your compass needle points)
and ***True North*** (north pole on the map – where Santa lives)



A typical isogonic chart. The black lines are isogonic lines which connect geographical points with identical magnetic variations.

Magnetic Declination

Magnetic North is drifting 22 to 34 miles per year toward Siberia.



Declination (variation):

-Your compass will always point to magnetic north, which is not the same as true north (which is what your map shows). The exception is when you are on the “Agonic Line”.

- You will always have to correct to convert your magnetic bearing to a true bearing.

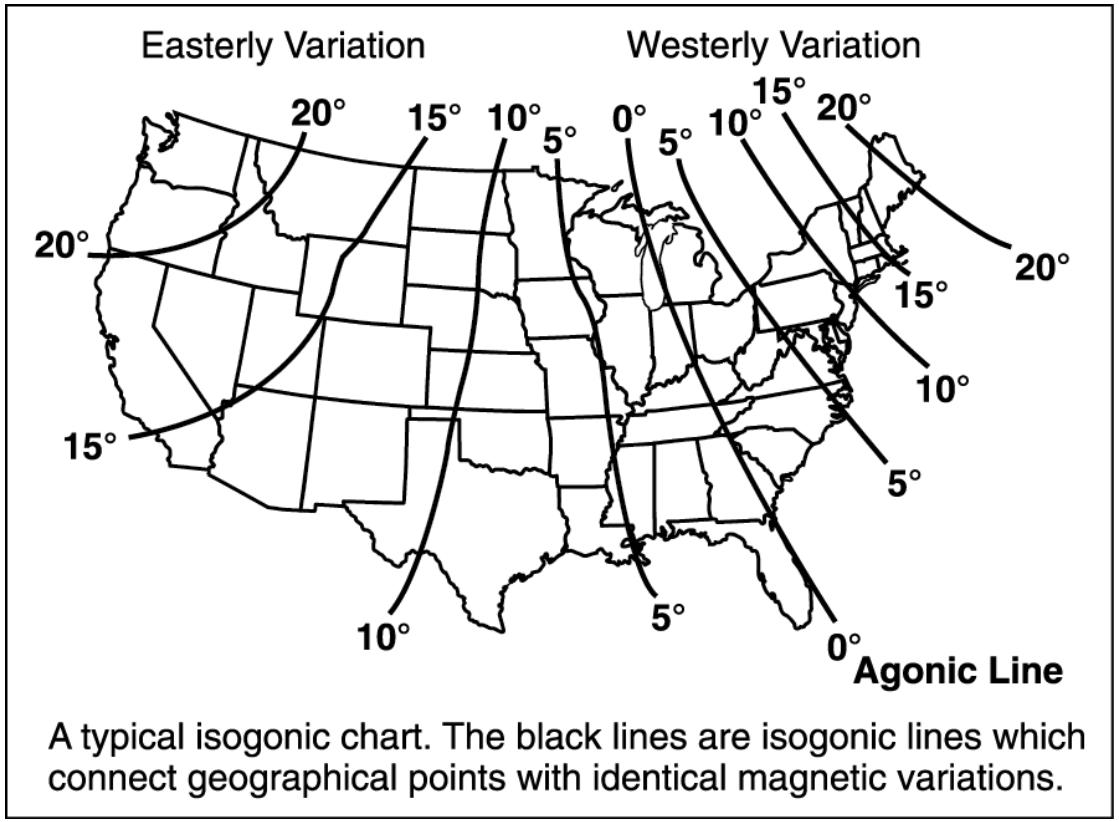
- You will also have to correct your true (map bearing) to a magnetic bearing to use your compass accurately.

- A compass that is adjustable for Declination will do this for you, otherwise you will need to do the math.

West of the Agonic Line is called an "Easterly Declination (Variation)"

-From the map bearing to the compass, subtract your declination and use that bearing with your compass.
Example 100º map bearing with an 11º declination. Dial in 89º

-From your compass to the map, add your declination and use that bearing on your map.
Example 270 compass bearing with a 11º declination, use 281º on your map.

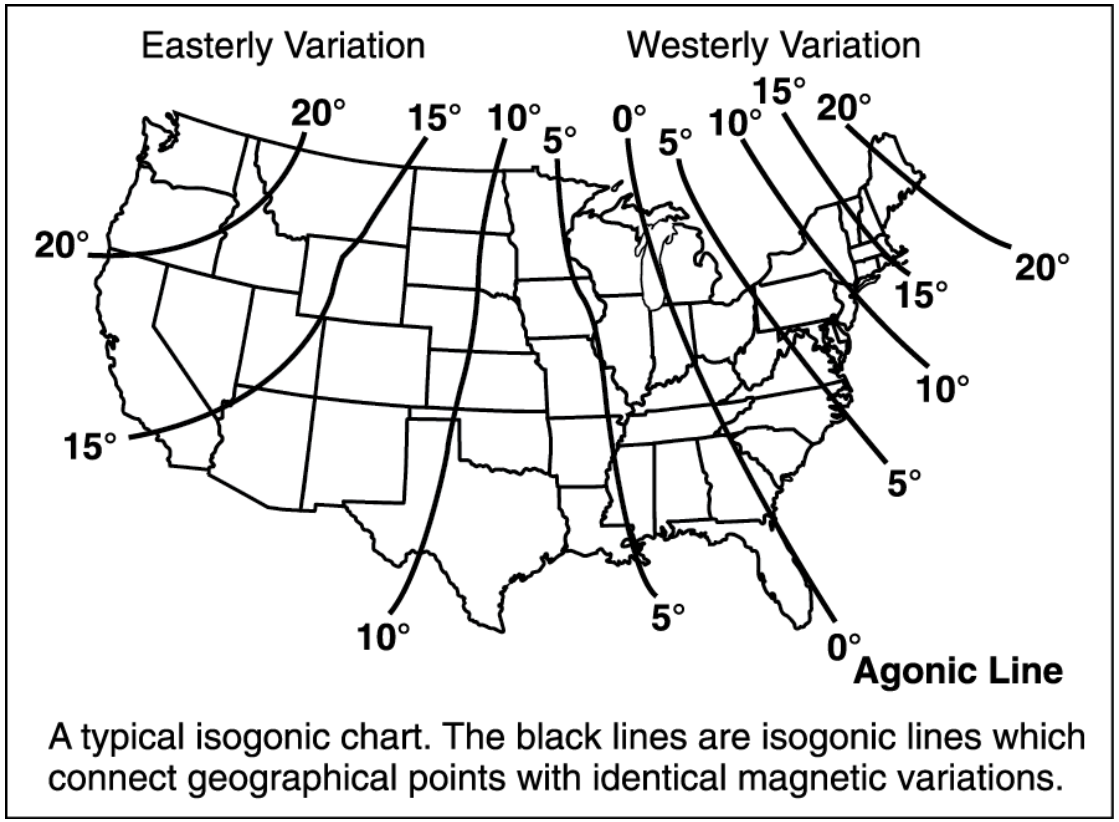


A typical isogonic chart. The black lines are isogonic lines which connect geographical points with identical magnetic variations.

East of the Agonic Line is called a "Westerly Declination (Variation)"

-From the map bearing to the compass, add your declination and use that bearing with your compass.
Example 100º map bearing with a 12º declination, Dial in 112º

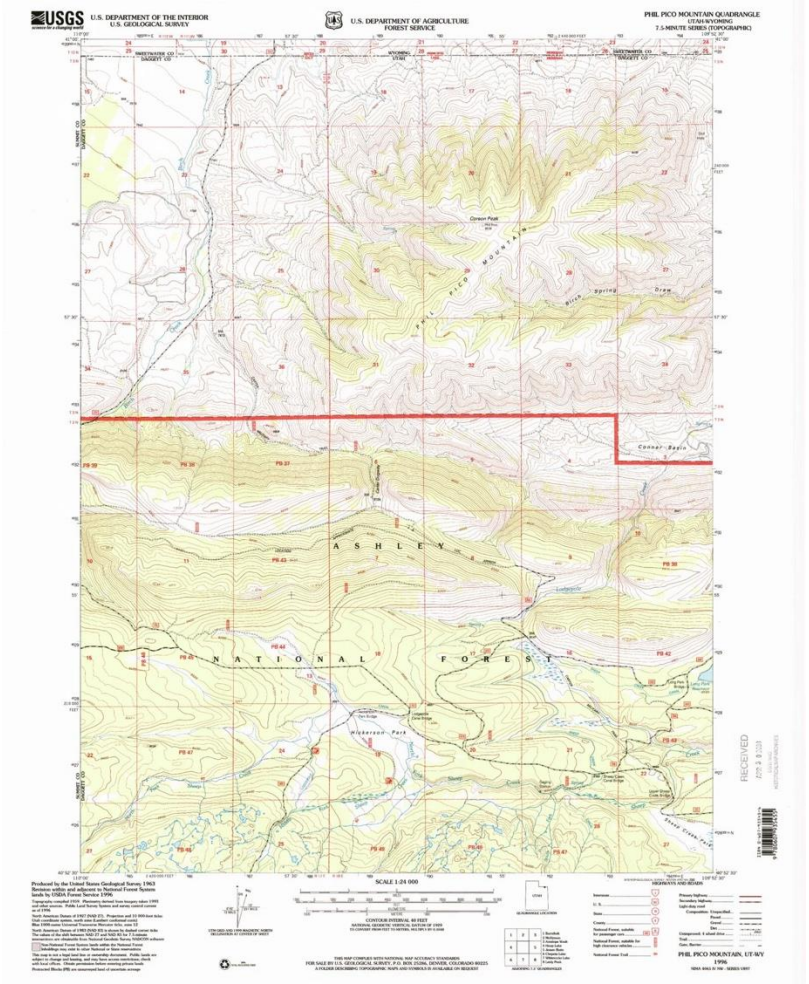
-From the compass to the map, subtract your declination and use that bearing on your map.
Example 100º compass bearing with 12º declination, use 88º on your map.



A typical isogonic chart. The black lines are isogonic lines which connect geographical points with identical magnetic variations.

Topographic Maps

Topo Maps provide detailed information of the area where you are hiking/backpacking

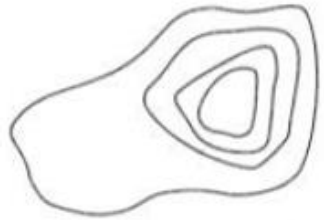


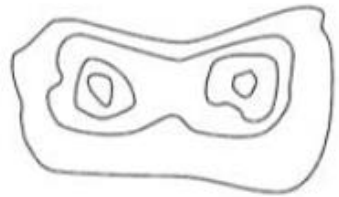


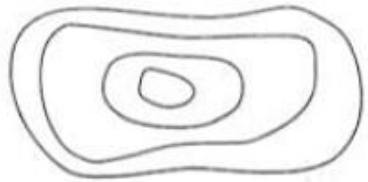
1:24,000 Scale:
1 inch = 24,000 inches (2,000 ft)

7.5 minute map:
covers 7.5 minutes (1/8 degree) of latitude and longitude
Roughly 6 - 7.5 miles (east/west) & roughly 8.5 - 9 miles (north/south)

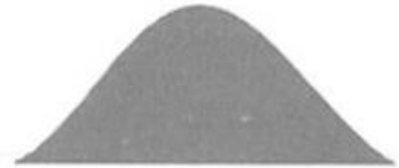
Match each contour outline on the left to the most appropriate hill shape on the right.

A. 

B. 

C. 

D. 

_____1. 

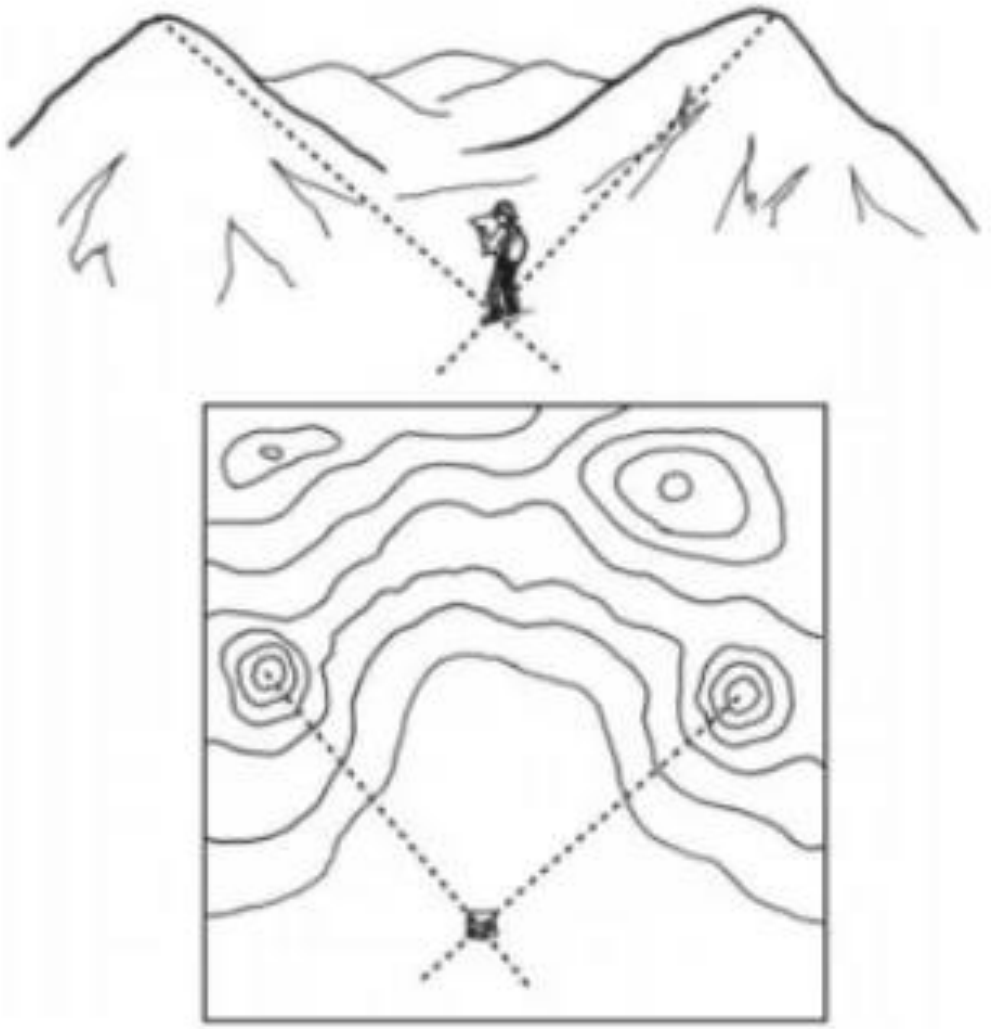
_____2. 

_____3. 

_____4. 

Triangulation (resection)

If lost, you may be able to find your location using triangulation on a Topographic Map



• You should have a compass and map (with knowledge of their use) in your pack or survival kit.

•If not, there are emergency & natural methods of navigation.
- Shadow Stick Method - Shown below.
- Natural Navigation: Spider Webs / Tree Roots / Using the Sun / Various other methods of Natural Navigation



Which way are we facing?



Mid-Winter, early morning frost.

© Tristan Gooley “The Natural Navigator


“3 Weeks without Food”
A Low Priority
in a survival situation
SALAD
SMOKED TURKEY LEG
RIBS
BERRIES
BREAD

Food is a very low priority in a Wilderness Survival Situation
Remember, over 90% are rescued within 24hrs and 95% within 3 days.

People have lived 3 weeks or more (not happily) without eating!

•Carry extra food in your pack for an un-planned overnight or two:

- •Chia seeds are a lightweight & power packed
- •Jerky (Beef or Turkey)
- •Nuts & Seeds
- •Meal Replacement Bars
- •Any compact, nutrition dense food with a long shelf life

Also, have some extra electrolytes on hand

Digestion requires water, so it's best not to eat if you are low on water.

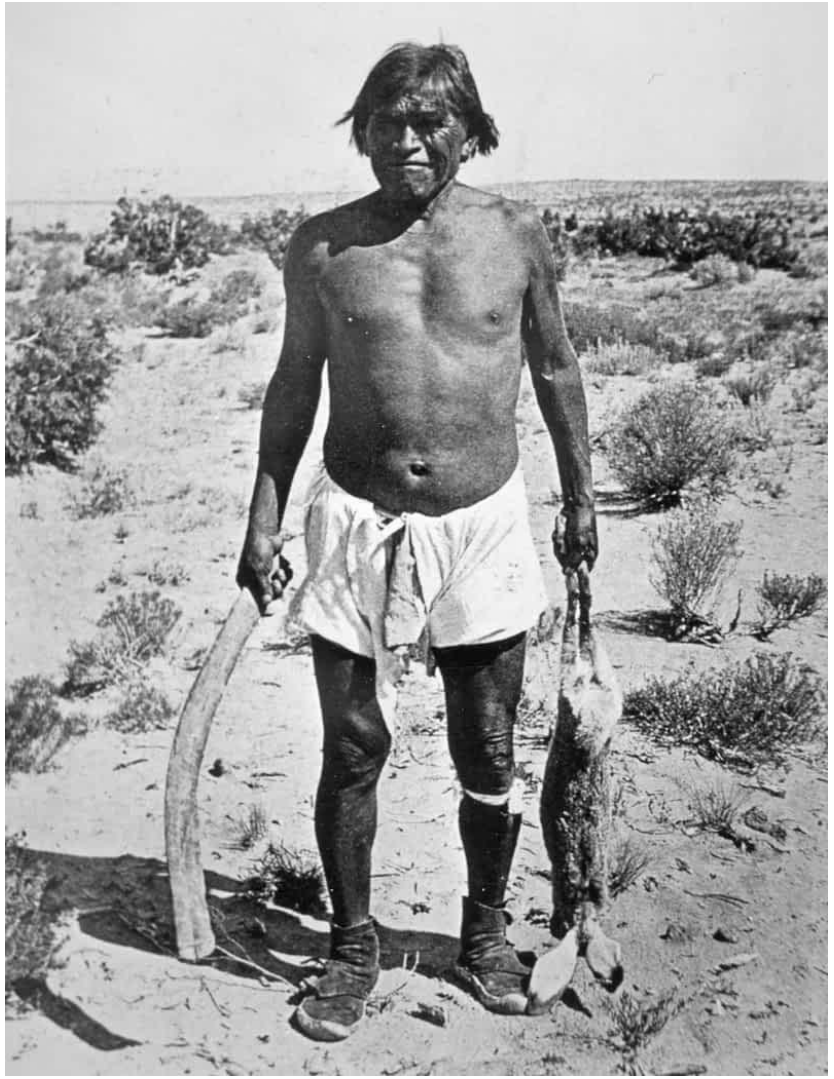
Trapping / Snaring



Foraging



Primitive Hunting Methods



Emergency Fishing Methods



Eating Grubs and Grasshoppers



