

# Comfort in the Outdoors

## Introduction to Backcountry

### What makes for a happy camper?

RULE OF THREES: 3 min/hrs/days/weeks PLUS

#### ■ Breathing

- ▶ CPR tradition - 6 minutes til brain damage if no oxygen -but 6 doesn't fit the mnemonic of '3' min
- ▶ Dangers:
  - Drowning in water (#1 killer in out of doors)
  - Carbon monoxide poisoning (stoves in enclosed spaces - i.e. your tent or snow shelter)
  - Avalanche suffocation

#### ■ Warmth

- ▶ 3 hours - it can take 3 hours to build and/or find good shelter - use your daylight time before night time darkness, cold, and loss of energy.
- ▶ Survival Shelters - debris hut/ snow cave

# What makes for a happy camper?

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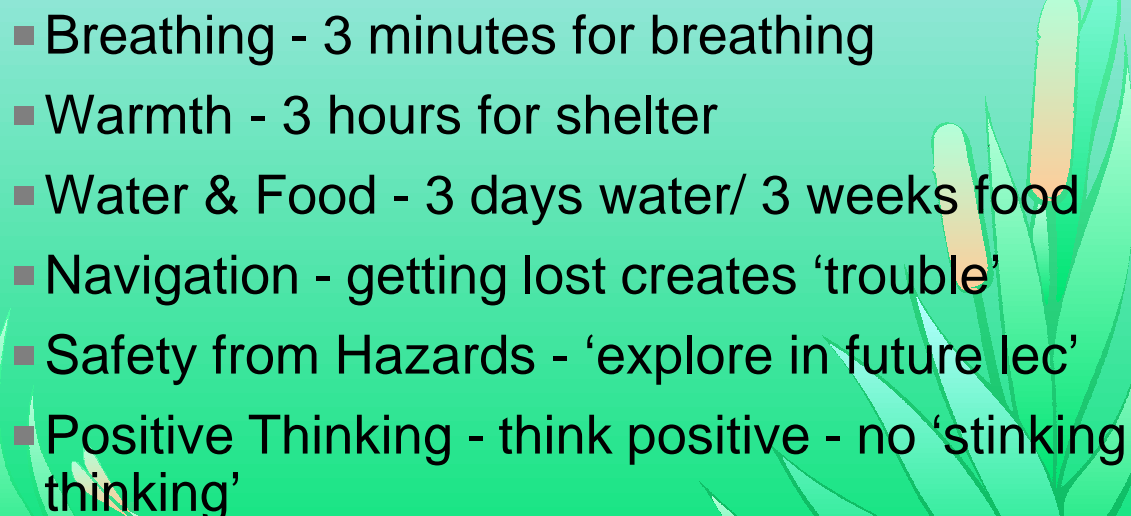
RULE OF THREES: 3 min/hrs/days/weeks PLUS

- Water
    - ▶ 3 days - life threatening dehydration can occur earlier but be conservative - you've got some time
  - Food
    - ▶ 3 weeks or more - don't let hunger pains mess up your priorities
  - Safety from Hazards
    - ▶ The novice fears what they shouldn't and is oblivious to what they should fear
  - Positive Thinking - no 'stinking thinking'
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# What makes for a happy camper?

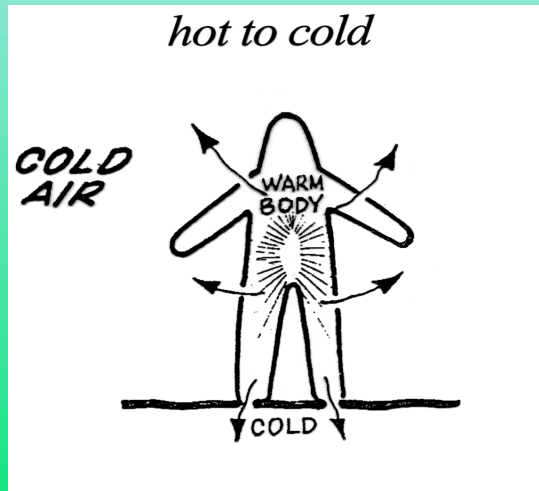
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RULE OF THREES: how long to deal with it before trouble

- Breathing - 3 minutes for breathing
  - Warmth - 3 hours for shelter
  - Water & Food - 3 days water/ 3 weeks food
  - Navigation - getting lost creates 'trouble'
  - Safety from Hazards - 'explore in future lec'
  - Positive Thinking - think positive - no 'stinking thinking'
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# Heat flow principle: hot to cold

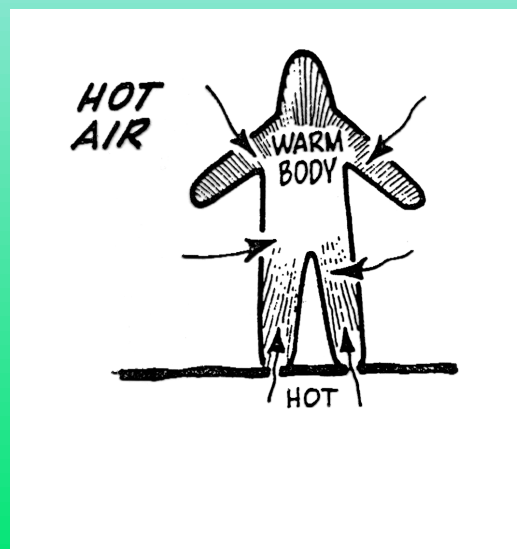
Warm body to colder air



Focus on learning to stay warm by understanding how 'warm works'

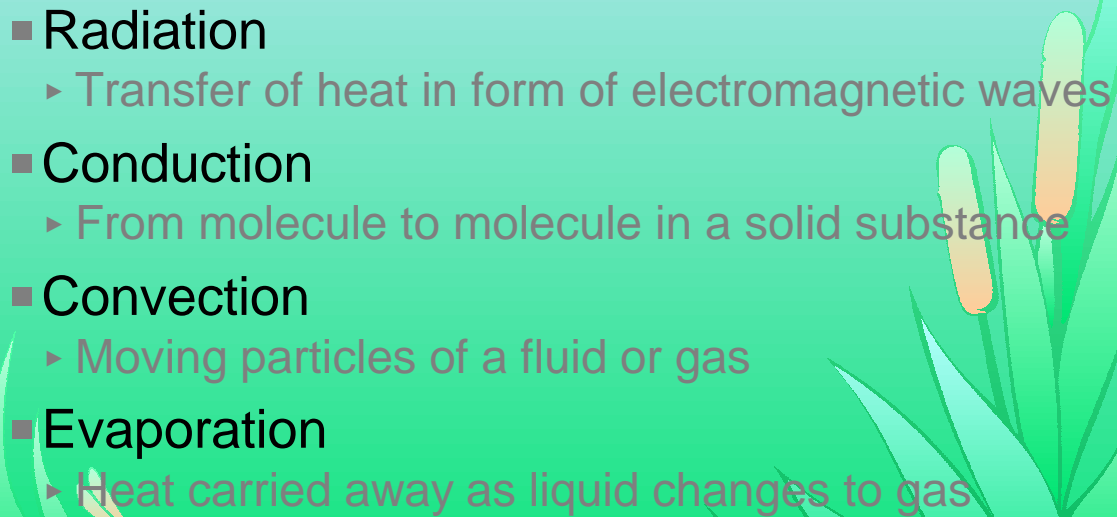
# Heat flow principle: hot to cold

Hot air to colder body



# Heat transfer mechanisms


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- Radiation
    - ▶ Transfer of heat in form of electromagnetic waves
  - Conduction
    - ▶ From molecule to molecule in a solid substance
  - Convection
    - ▶ Moving particles of a fluid or gas
  - Evaporation
    - ▶ Heat carried away as liquid changes to gas
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# The fight against being cold

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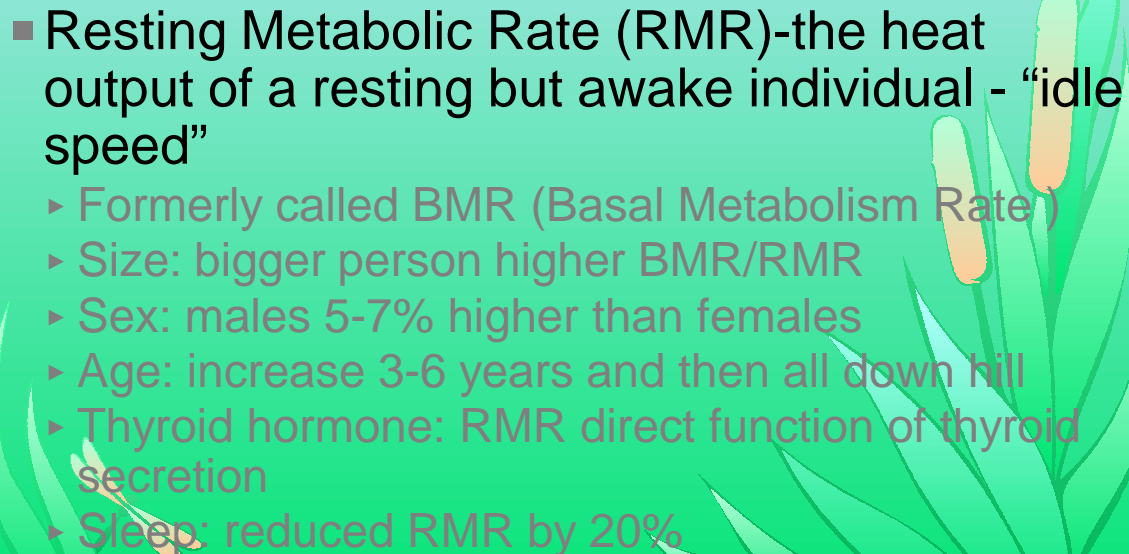
Strategy # 1 - Insulation

- Slow down heat loss
    - ▶ Radiation - any opaque surface
    - ▶ Convection - slow or stop movement of air/water
    - ▶ Conduction - use 'good material' characteristics
  - Practical applications
    - ▶ Layering - (80% heat loss is through the skin)
    - ▶ Head and neck coverings
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# The fight against being cold

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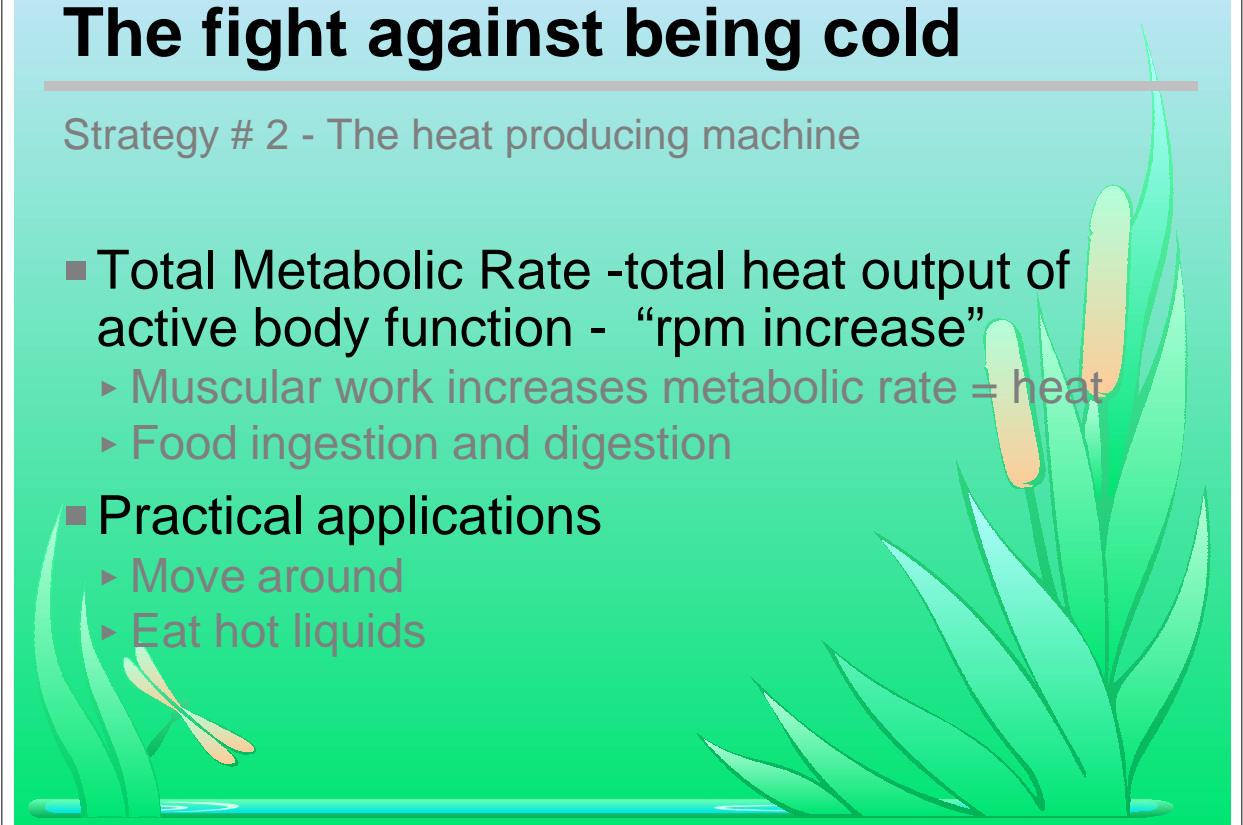
Strategy # 2 - The heat producing machine

- Resting Metabolic Rate (RMR)-the heat output of a resting but awake individual - “idle speed”
    - ▶ Formerly called BMR (Basal Metabolism Rate )
    - ▶ Size: bigger person higher BMR/RMR
    - ▶ Sex: males 5-7% higher than females
    - ▶ Age: increase 3-6 years and then all down hill
    - ▶ Thyroid hormone: RMR direct function of thyroid secretion
    - ▶ Sleep: reduced RMR by 20%
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# The fight against being cold

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Strategy # 2 - The heat producing machine

- Total Metabolic Rate -total heat output of active body function - “rpm increase”
    - ▶ Muscular work increases metabolic rate = heat
    - ▶ Food ingestion and digestion
  - Practical applications
    - ▶ Move around
    - ▶ Eat hot liquids
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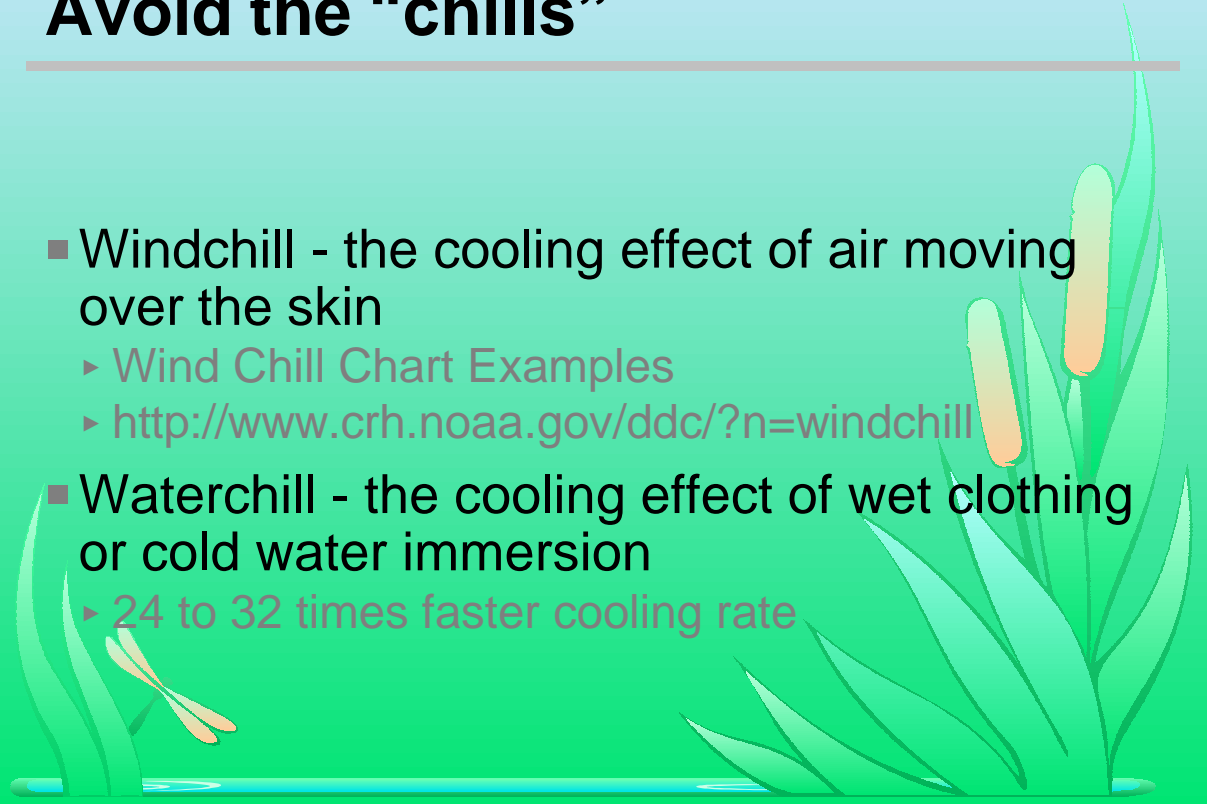
# The Layering System

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- Inner layer /under garment layer
    - ▶ Thermals - wick away moisture from skin optimal
  - Insulation layer
    - ▶ Sweaters/ Pile jackets/ Vests
  - Outer shell layer
    - ▶ Wind breakers/ rain parkas
  - Advantages
    - ▶ Regulation of comfort - not single heavy garment
    - ▶ Low cost for layers
    - ▶ Each layer traps air - nonmoving air great insulator
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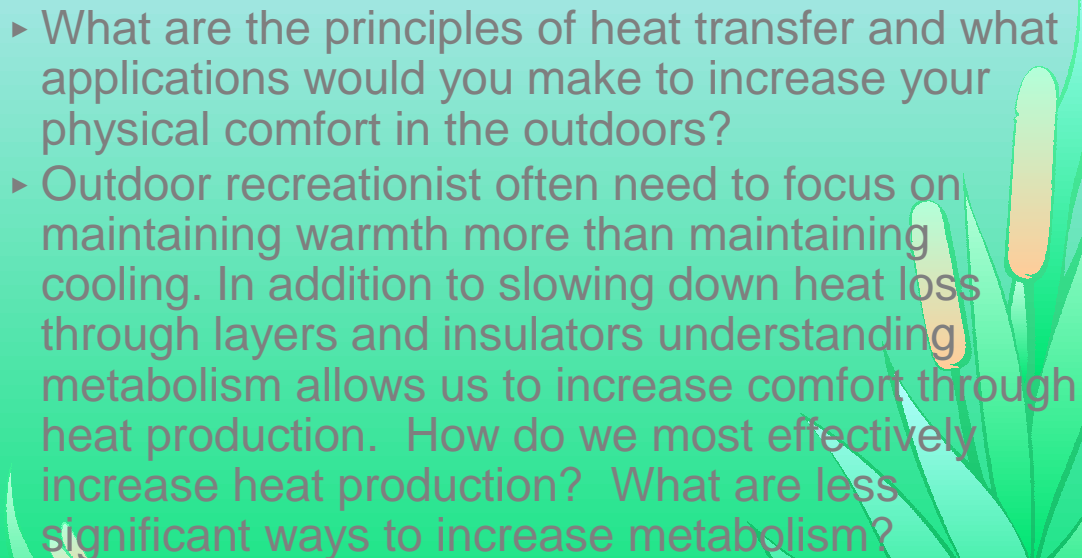
# Avoid the “chills”

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- Windchill - the cooling effect of air moving over the skin
    - ▶ Wind Chill Chart Examples
    - ▶ <http://www.crh.noaa.gov/ddc/?n=windchill>
  - Waterchill - the cooling effect of wet clothing or cold water immersion
    - ▶ 24 to 32 times faster cooling rate
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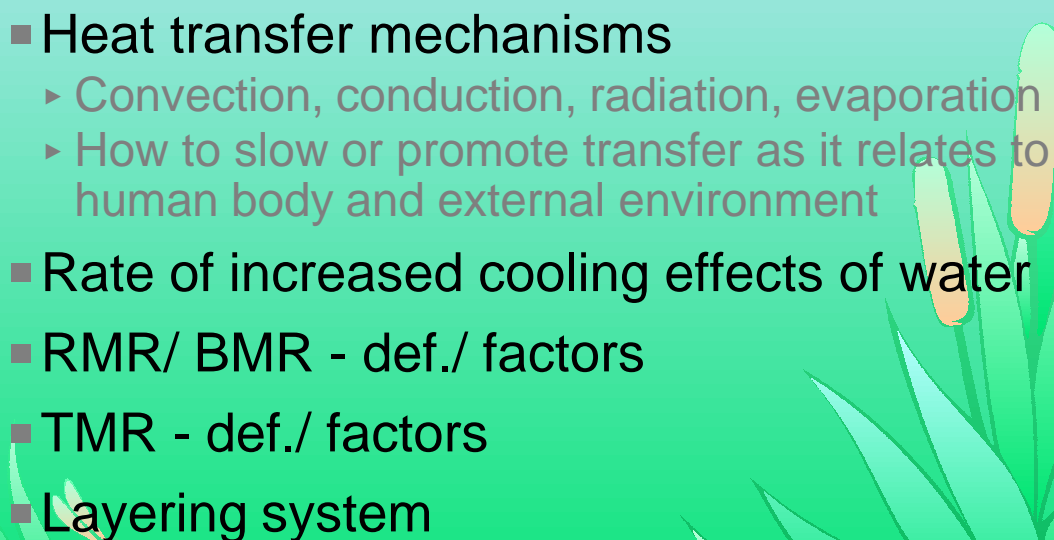
## KEY QUESTIONS

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- ▶ What are the principles of heat transfer and what applications would you make to increase your physical comfort in the outdoors?
  - ▶ Outdoor recreationist often need to focus on maintaining warmth more than maintaining cooling. In addition to slowing down heat loss through layers and insulators understanding metabolism allows us to increase comfort through heat production. How do we most effectively increase heat production? What are less significant ways to increase metabolism?
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## KEY TERMS

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- Heat transfer mechanisms
    - ▶ Convection, conduction, radiation, evaporation
    - ▶ How to slow or promote transfer as it relates to human body and external environment
  - Rate of increased cooling effects of water
  - RMR/ BMR - def./ factors
  - TMR - def./ factors
  - Layering system
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# What's Next

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In the next section you will need to understand the body's response when it fails to adequately regulate heat loss and heat gain from the outdoor environment: hypothermia and hyperthermia

# Textbook Option for RTM 150

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- **Mountaineering Freedom of the Hills**

- ▶ If you want one outdoor skills book, this is a good option if interested in climbing (rock or snow) as well as general backpacking. Recommend this book because it can be used as a single text for RTM 150, RTM 151A Backpacking, RTM 151B Rock Climbing, and RTM 151C Winter Mountaineering.



- ▶ Reading for RTM 150 Units I and II would be MFH Chapters 1&2 -pgs 1-42.
- ▶ NOLS's Wilderness Guide by Mark Harvey is a good general text for back country travel without all the rock and snow detail of Freedom of the Hills.