

Backcountry Operations: Clothing, Weather, Hygiene





2008, Peter Campbell



2016, BLM Nevada



2013, Laurel F



2012, Ray Terrill



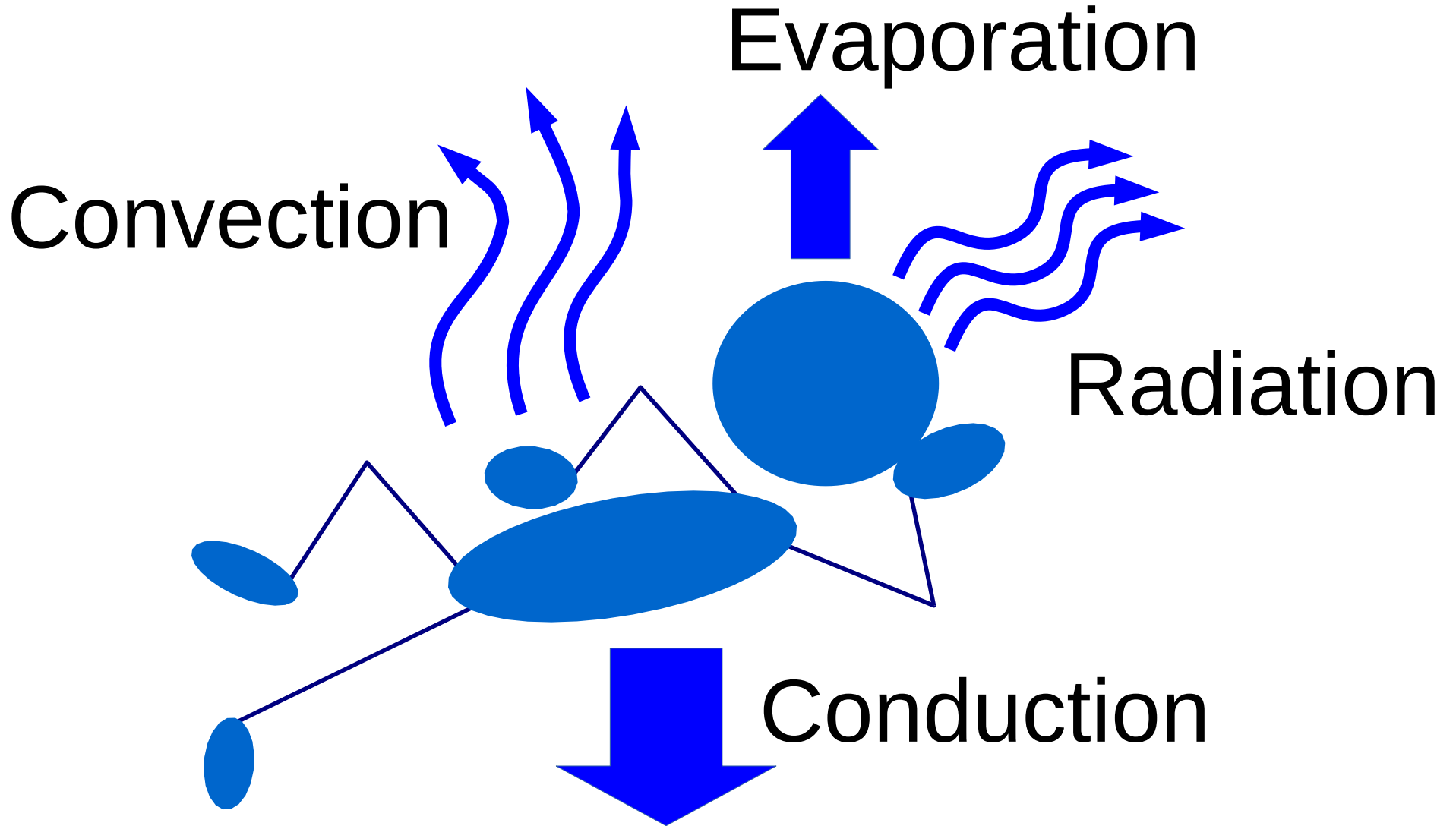
Fitness

- One possible benchmark: US Forest Service Wildland Firefighter Moderate Work Capacity Test (NWCG PMS 307)
 - 2 mile hike
 - with 25 lb pack
 - in 30 minutes (4 mile per hour pace)

How do you lose heat?



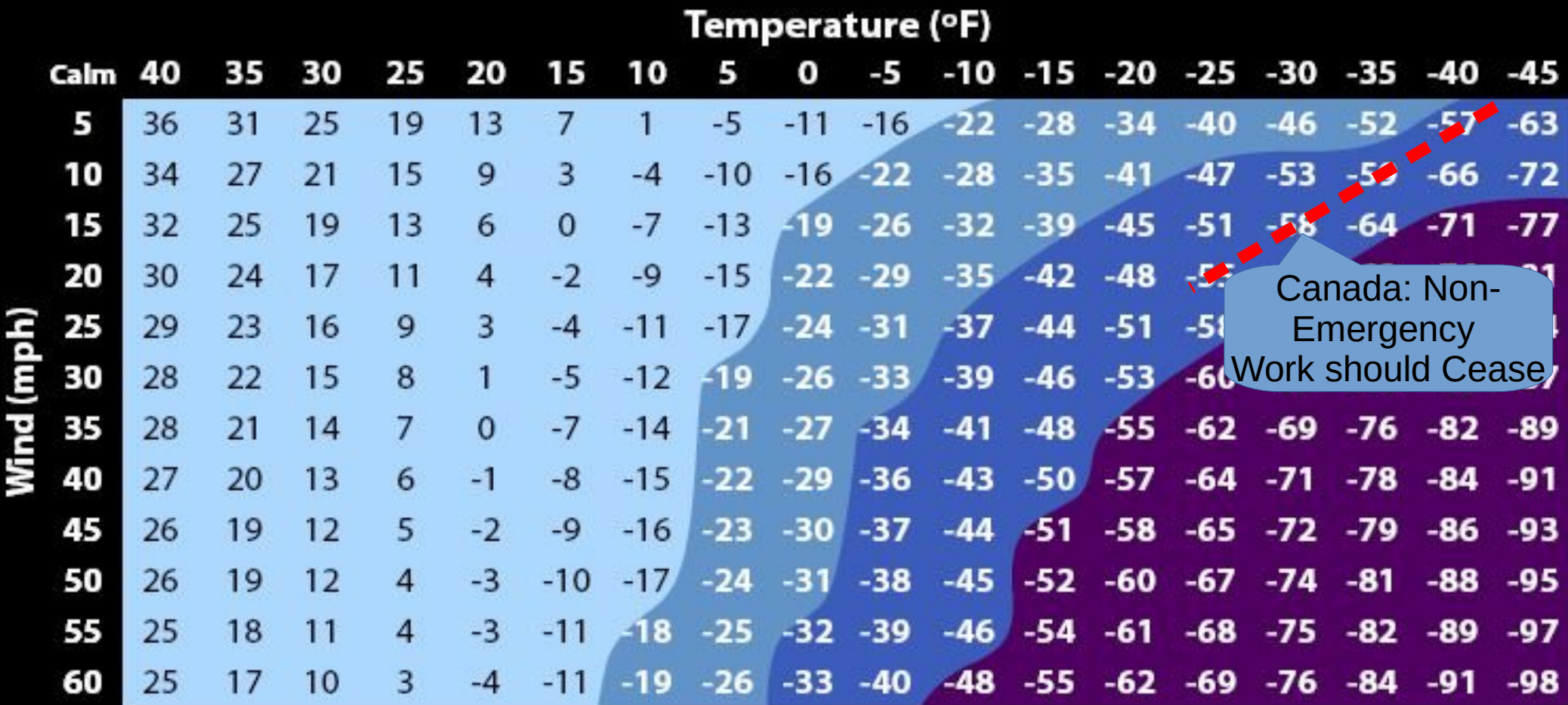
Heat Loss



- Air is a good insulator
 - Unless it is moving
- Water is good at conducting heat
 - Evaporating water is very good at removing heat.
- The ground is good at conducting heat

- To stay warm:
 - Stay Dry
 - Trap air next to your body
- To stay cool:
 - Let moisture evaporate from your skin
 - Let air get moved away from your skin

Wind Chill



Canada: Non-Emergency Work should Cease

Frostbite Times 30 minutes 10 minutes 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

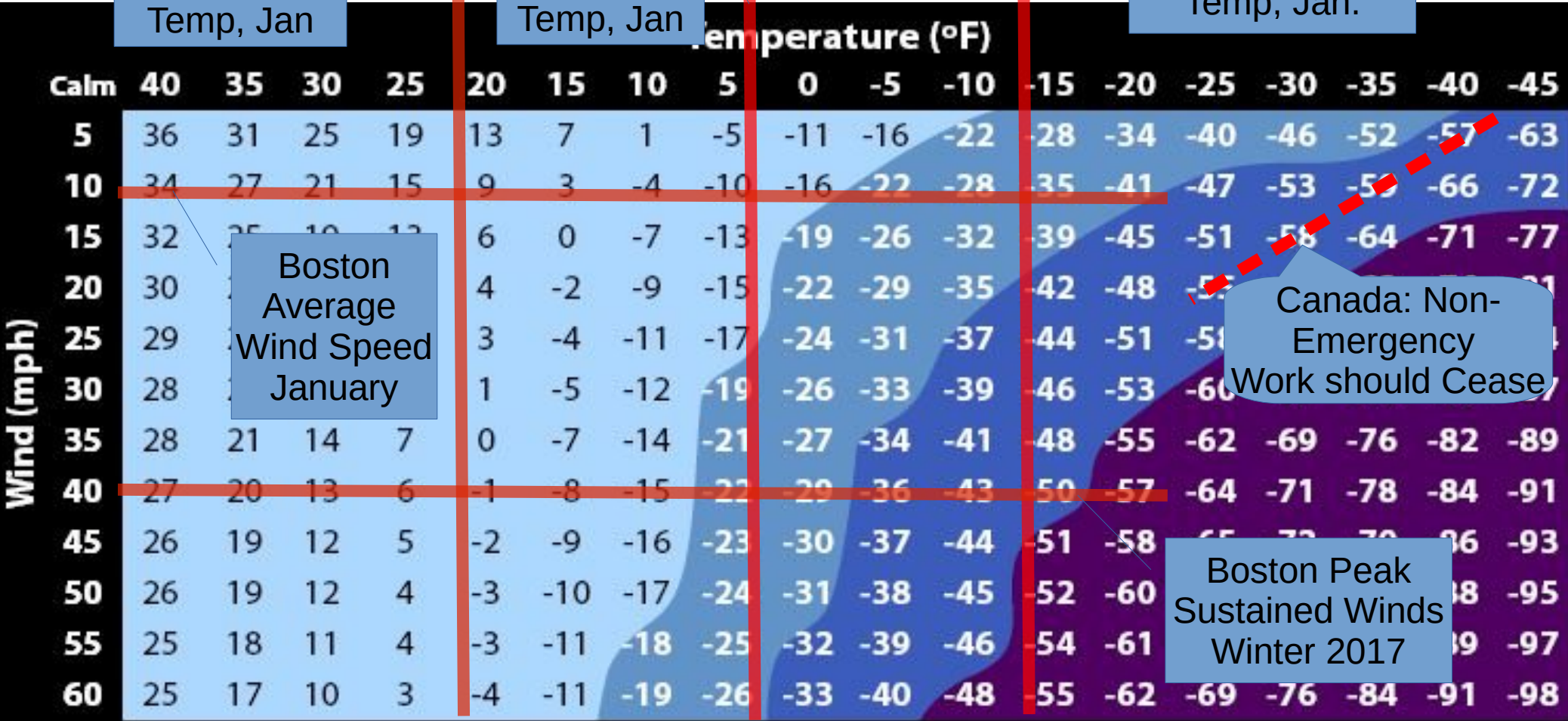
Effective 11/01/01

Wind Chill

Boston Average Low Temp, Jan

Mean Minimum Temp, Jan

Boston Record Low Temp, Jan.



Boston Average Wind Speed January

Canada: Non-Emergency Work should Cease

Boston Peak Sustained Winds Winter 2017

Frostbite Times 30 minutes 10 minutes 5 minutes

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Where, T= Air Temperature (°F) V= Wind Speed (mph)

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Adjust to Change

- The Environment Changes
- Your Activity Levels Change

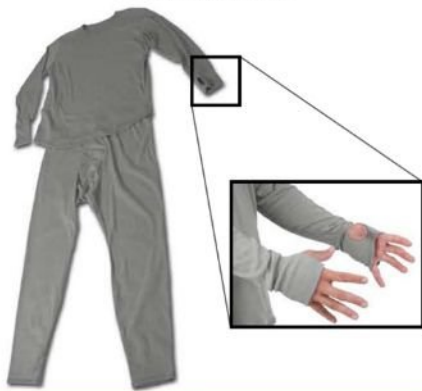
UNDERLAYER 1



Male

Female

BASE LAYER 2



INTERMEDIATE OUTER LAYER 6



Insulating Softshell Jacket

Vest

Insulating Softshell Pants

MIDWEIGHT LAYER 3



SOCKS



EXTREME WEATHER OUTER LAYER 7



Shell Parka

Removable Liner

Shell Pants

LIGHT OUTER LAYER 5



Windshirt Style Pants

Windshirt Style Jacket

COLD WEATHER FLYER'S GLOVE



FR RIGGER'S BELT



Wicking



Warmth

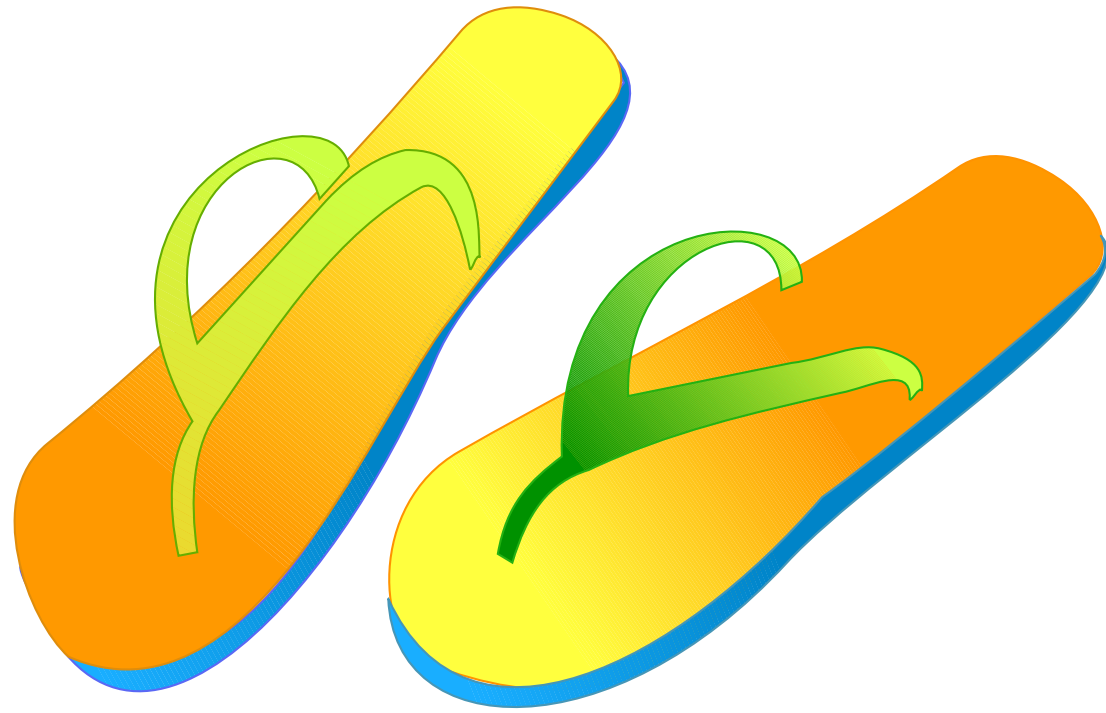


Wind/Water



Fabrics

- Polyester
- Acrylic
- Nylon
- Silk
- Wool
- Cotton

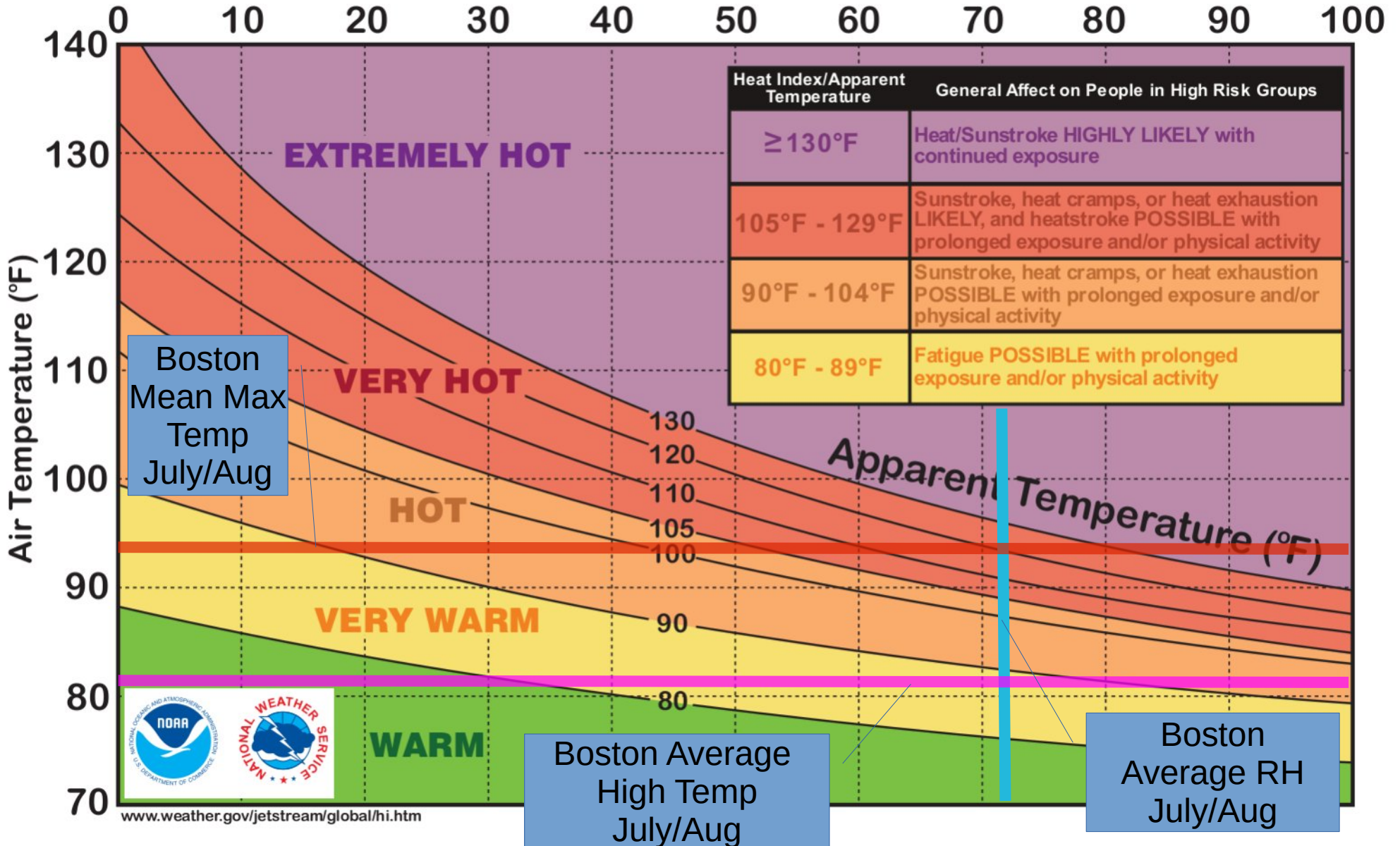






Heat Index

Relative Humidity (%)

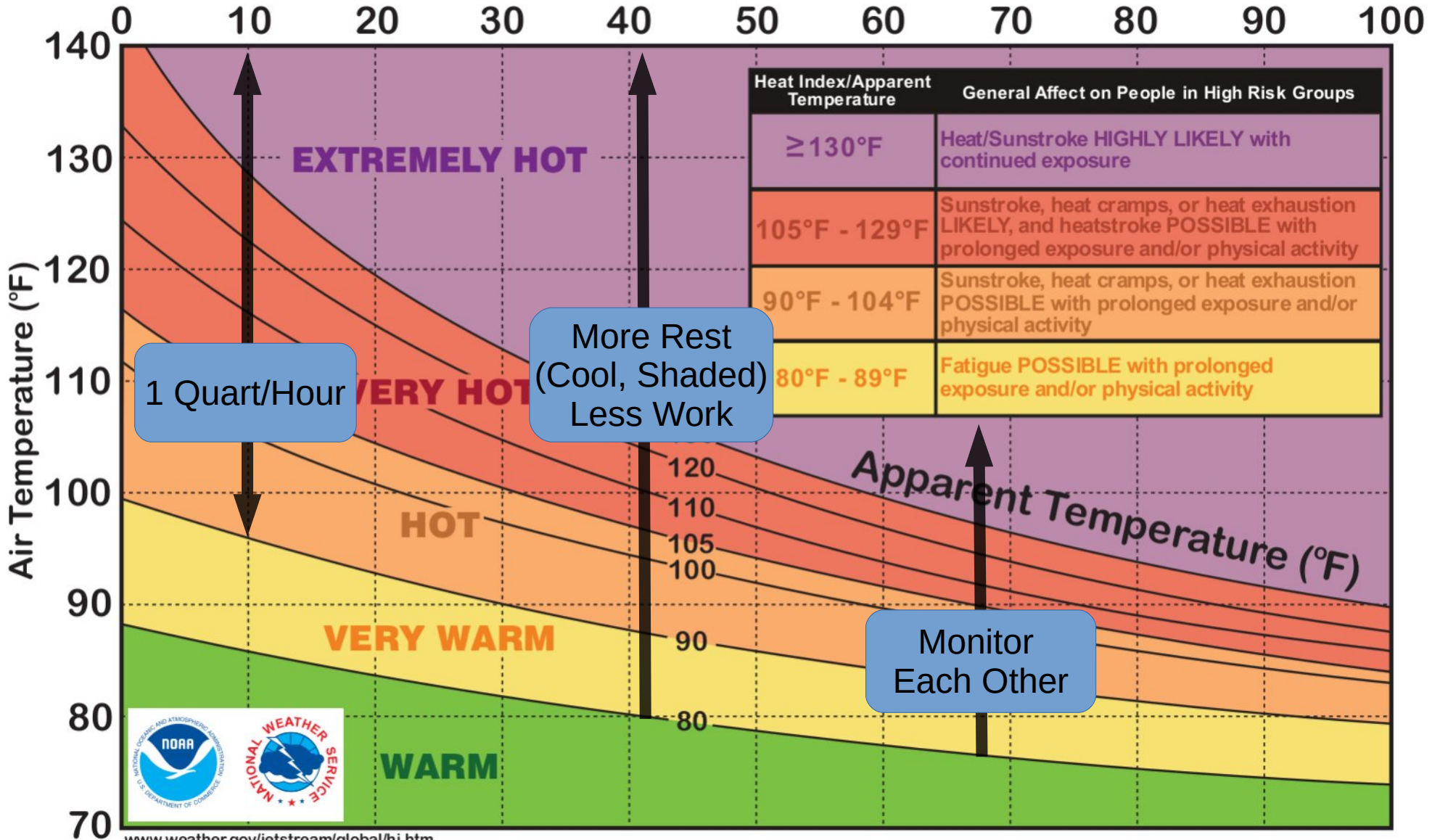


Hydrate

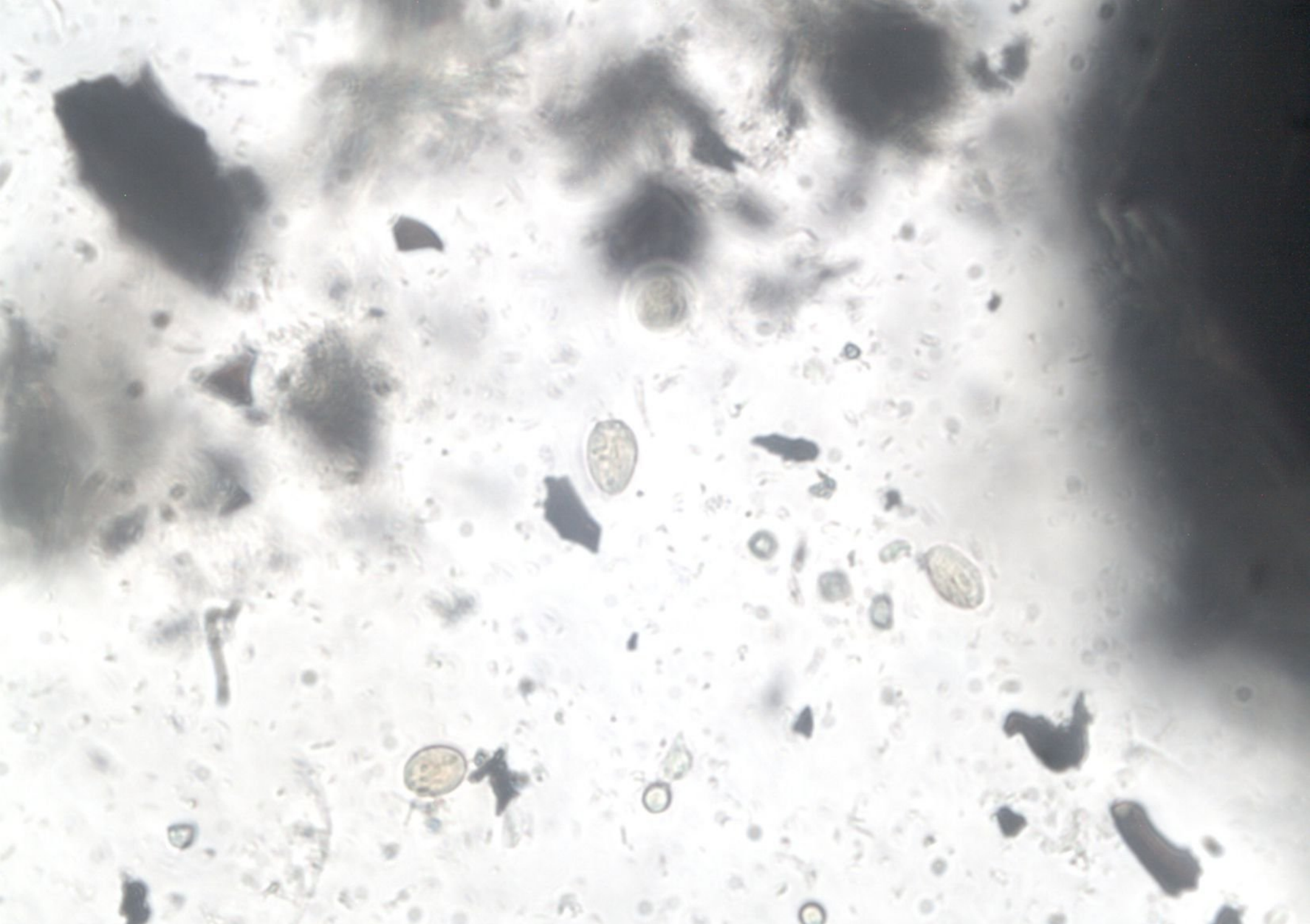


Heat Index

Relative Humidity (%)









3 microns



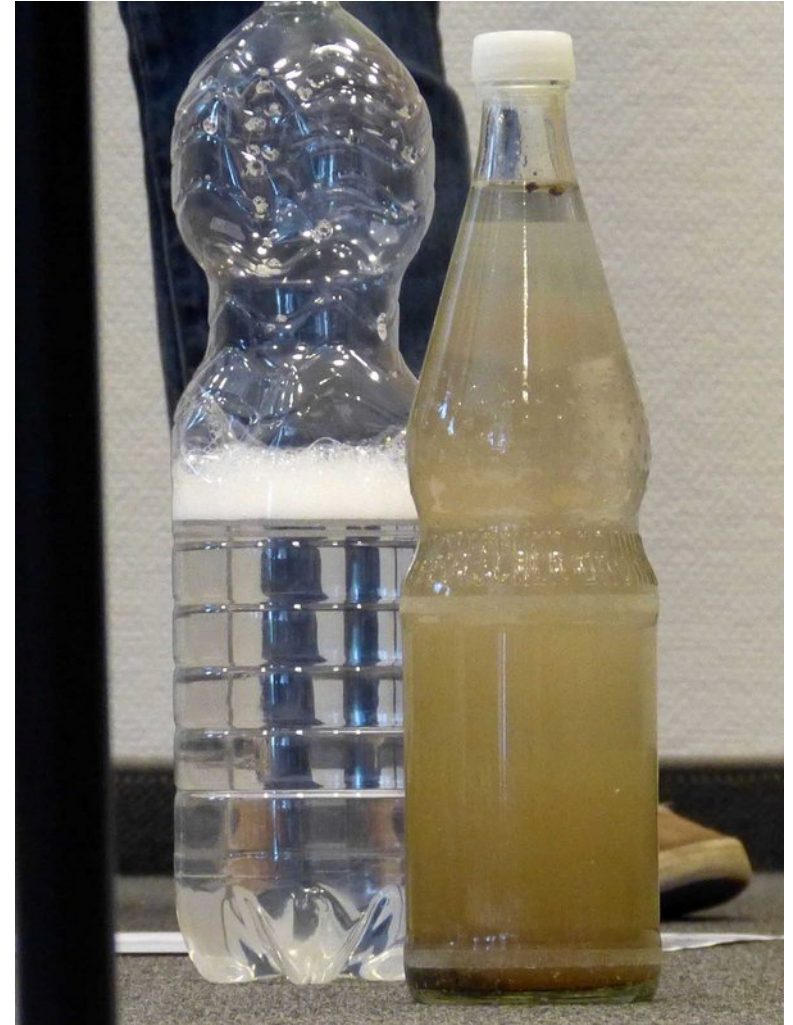


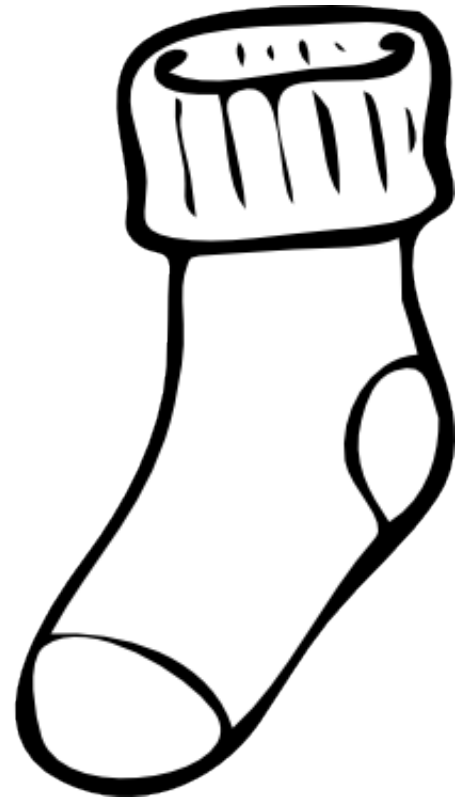
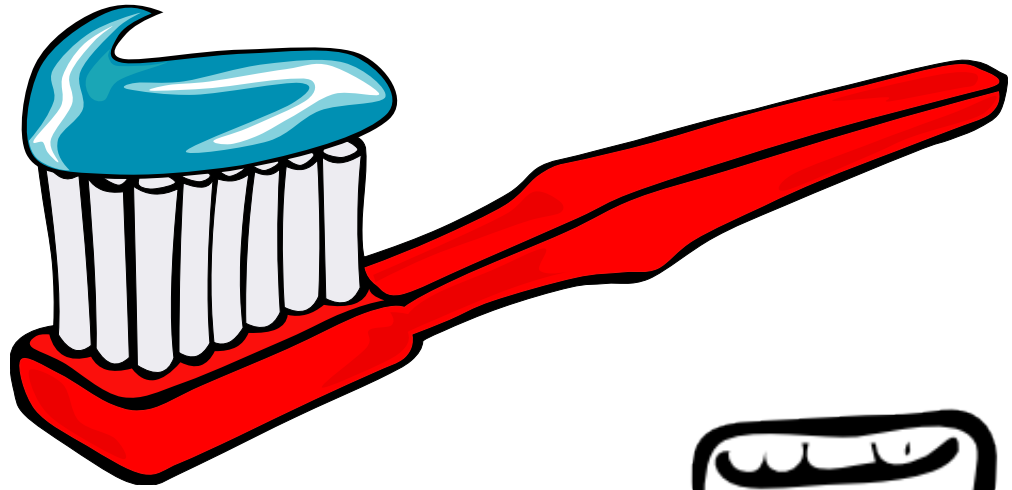
Water Disinfection

- **Boiling:** Rolling boil for 1 minute minimum
 - If over 2000 m altitude, boil for 3 minutes minimum.
- **Combined Chemical Disinfection and Filtration**
 - Filtering: ≤ 1 micron (cyst reduction/removal filter)
Protozoans, some bacteria, not viruses. (“if you can’t make it clear you can’t make it clean”)
 - Chemicals: Iodine, Chlorine, Chlorine Dioxide
Some protozoans, bacteria, viruses.

Water Disinfection

- UV treatment (combined filtration and UV treatment)
 - Limited to clear water
 - If you can't make it clear you can't make it clean
 - Pre-filter water
 - Follow manufacturer's directions.

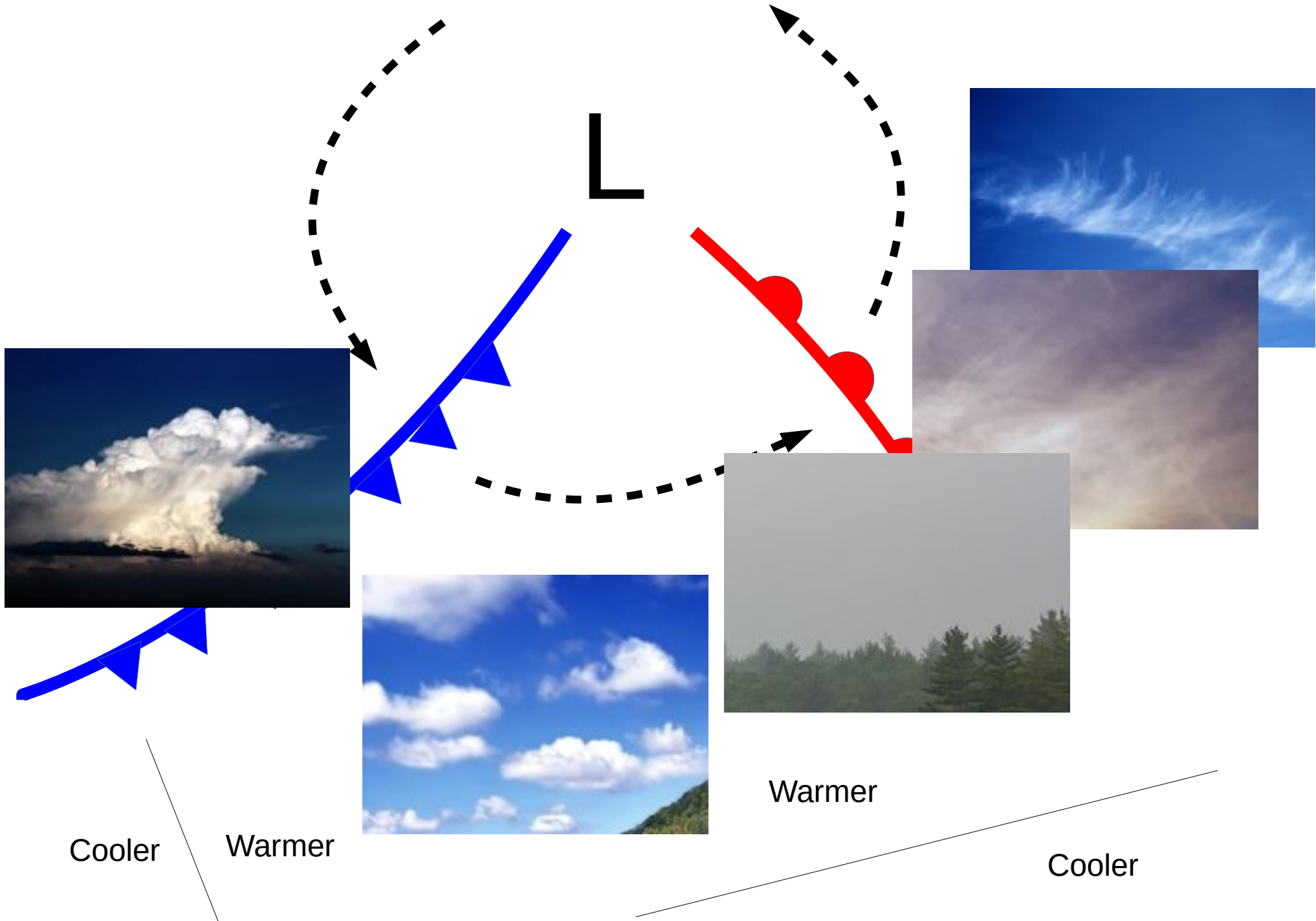




Toilet

- Bury human waste 8" deep and at least 200 feet from natural waters.
- Wash hands
 - Before handling food
 - Before eating
 - After using the toilet







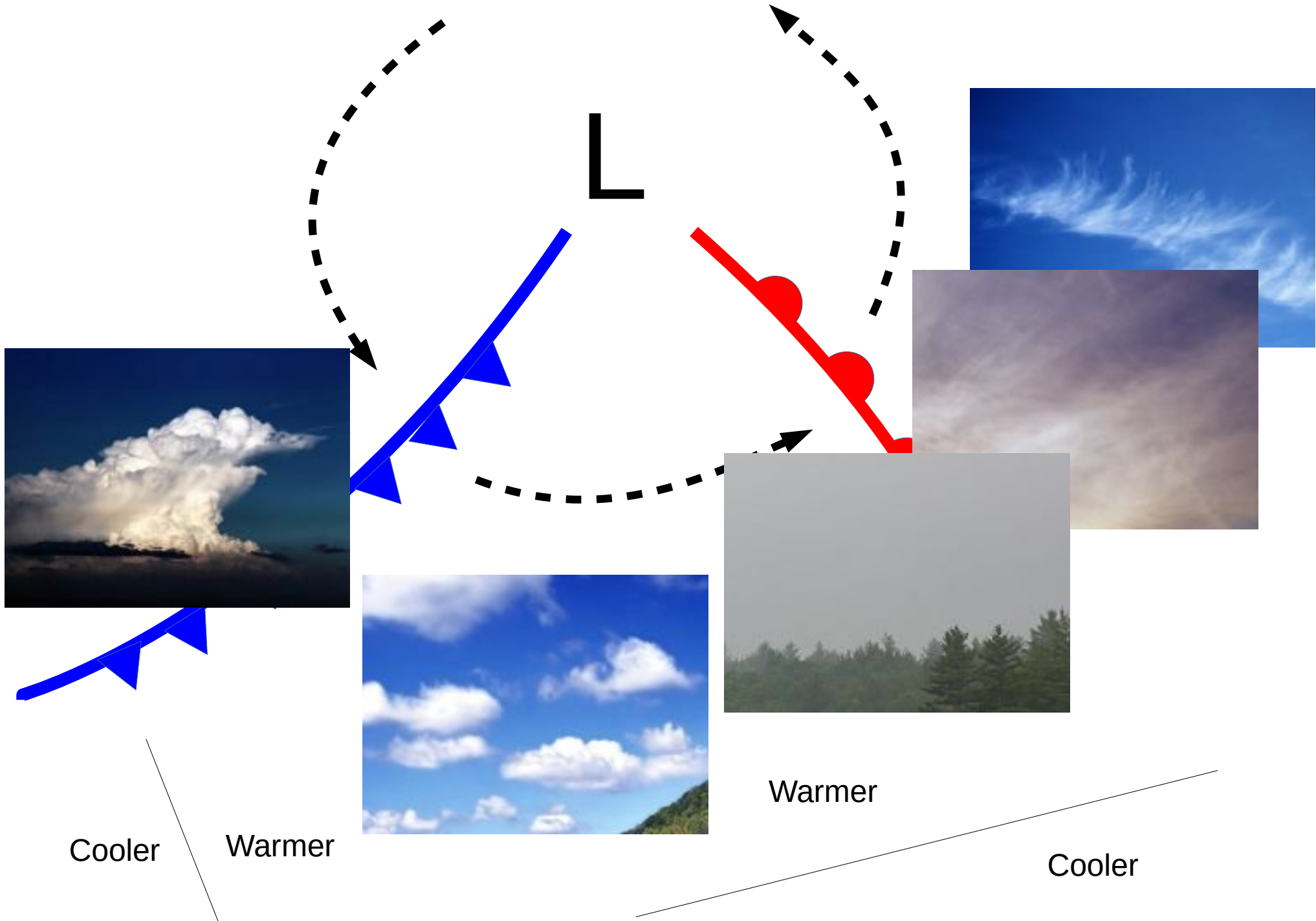


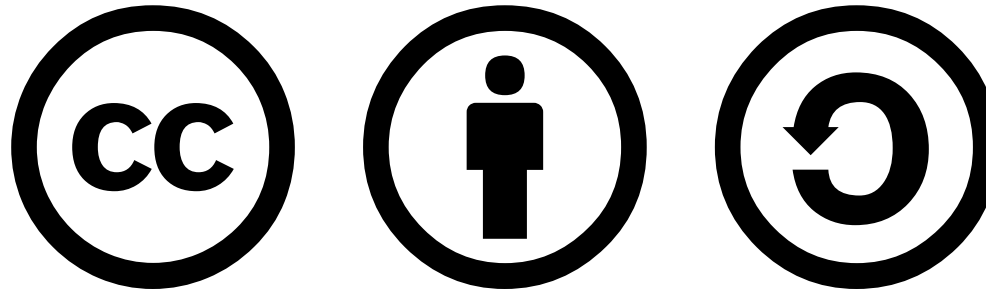












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