



“Water 101: Introduction to Water and Water Quality”

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Di-hydrogen monoxide (DHMO)

DHMO KILLS

Dangers:

- Death by inhalation
- Corrodes metals
- Bloating & nausea
- Electrical short-circuit
- Tissue damage & burns
- Soil erosion
- Brake failure
- Disaster & destruction

Uses:

- Animal research
- Abortion clinics
- Nuclear plants
- Chemical warfare
- Performance enhancers
- Torture
- Cult rituals
- Fire suppression

Places:

- Cancerous tumors
- Cleaning solvents
- Prisons & hospitals
- Acid rain
- Pharmaceuticals
- Lakes & streams
- Industrial waste
- Baby food & beer

CAUTION



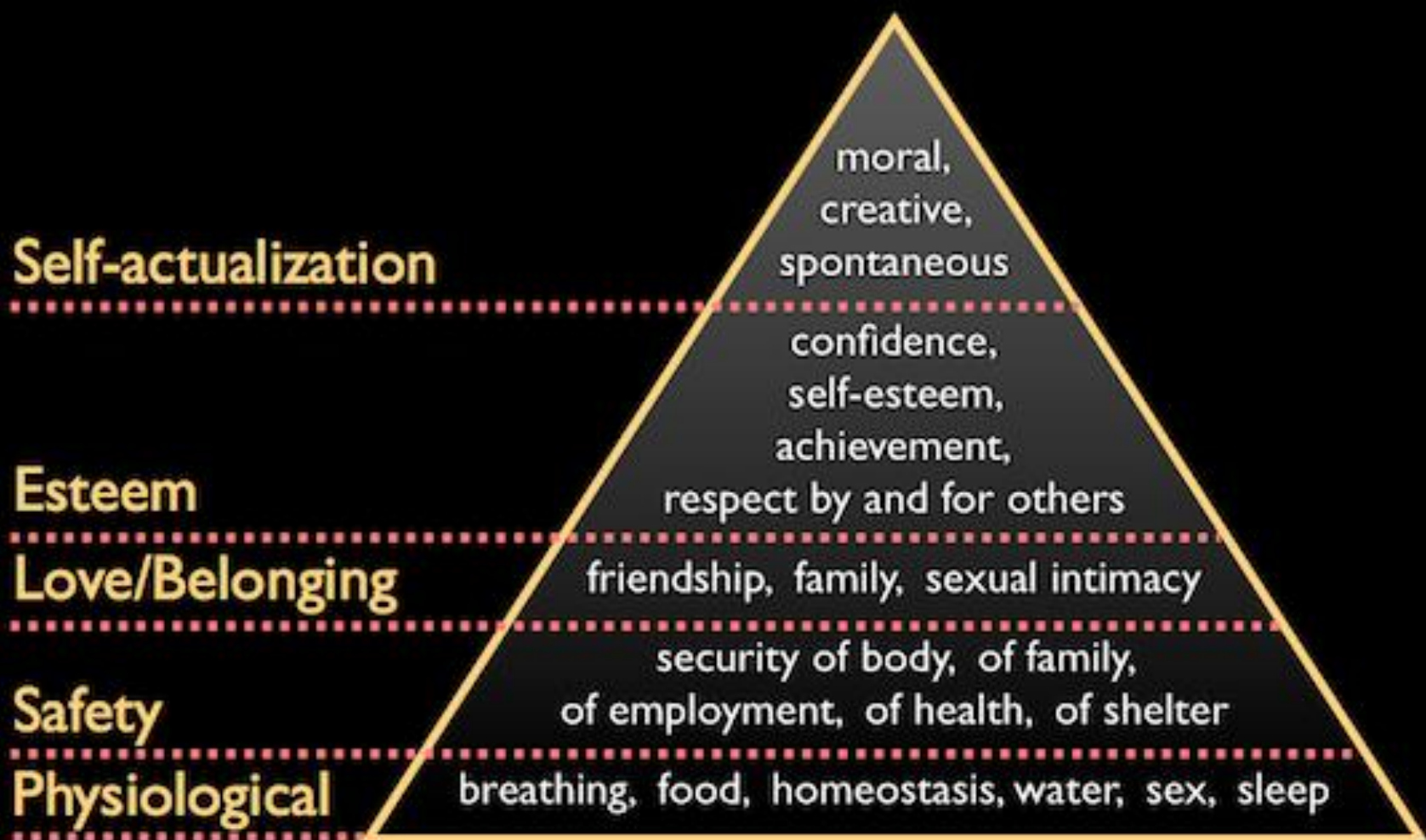
**CONTAINS
DIHYDROGEN MONOXIDE**

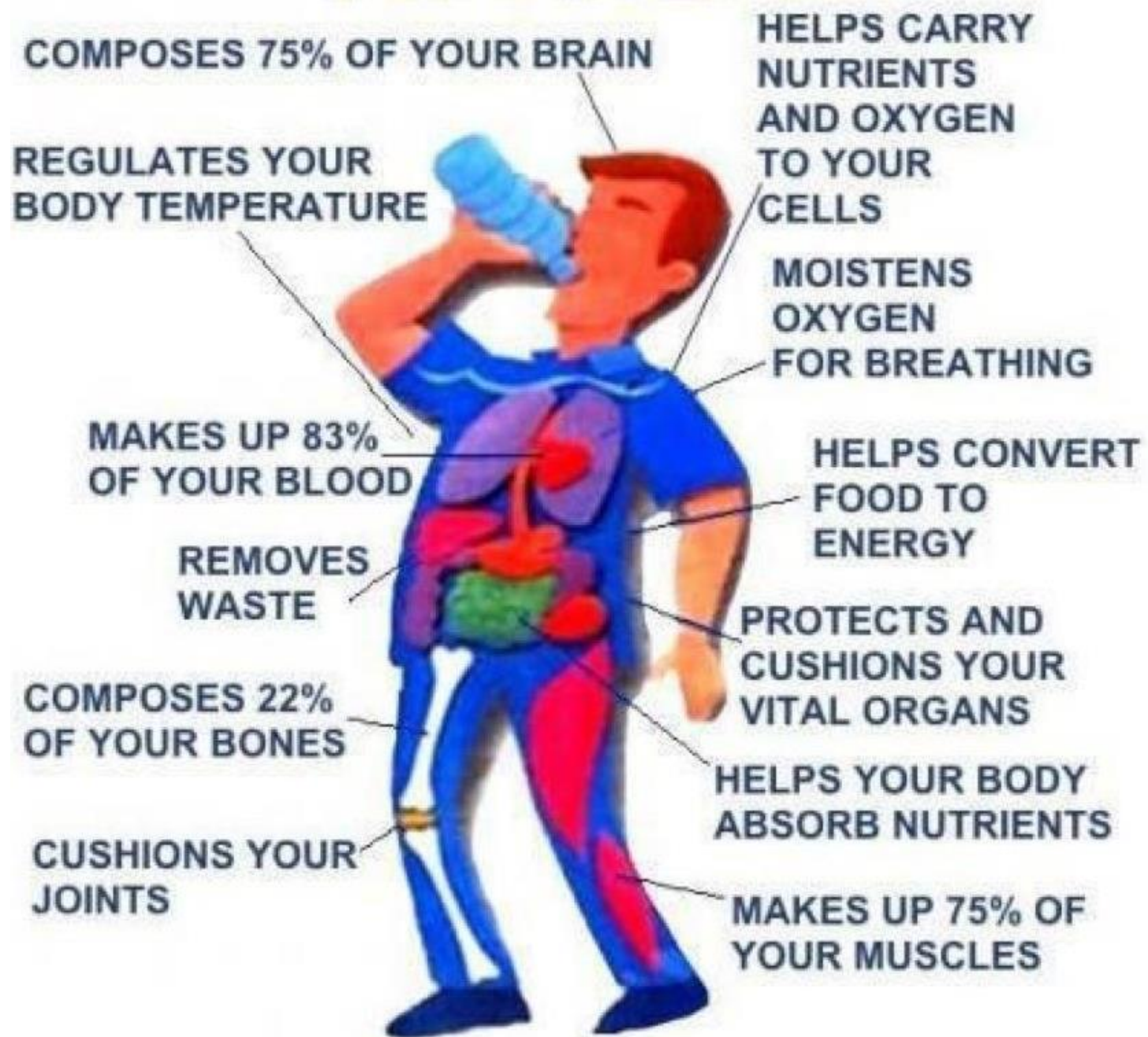
Ban Dihydrogen Monoxide

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Maslow's Hierarchy of Needs





Maslow's Hierarchy of Needs

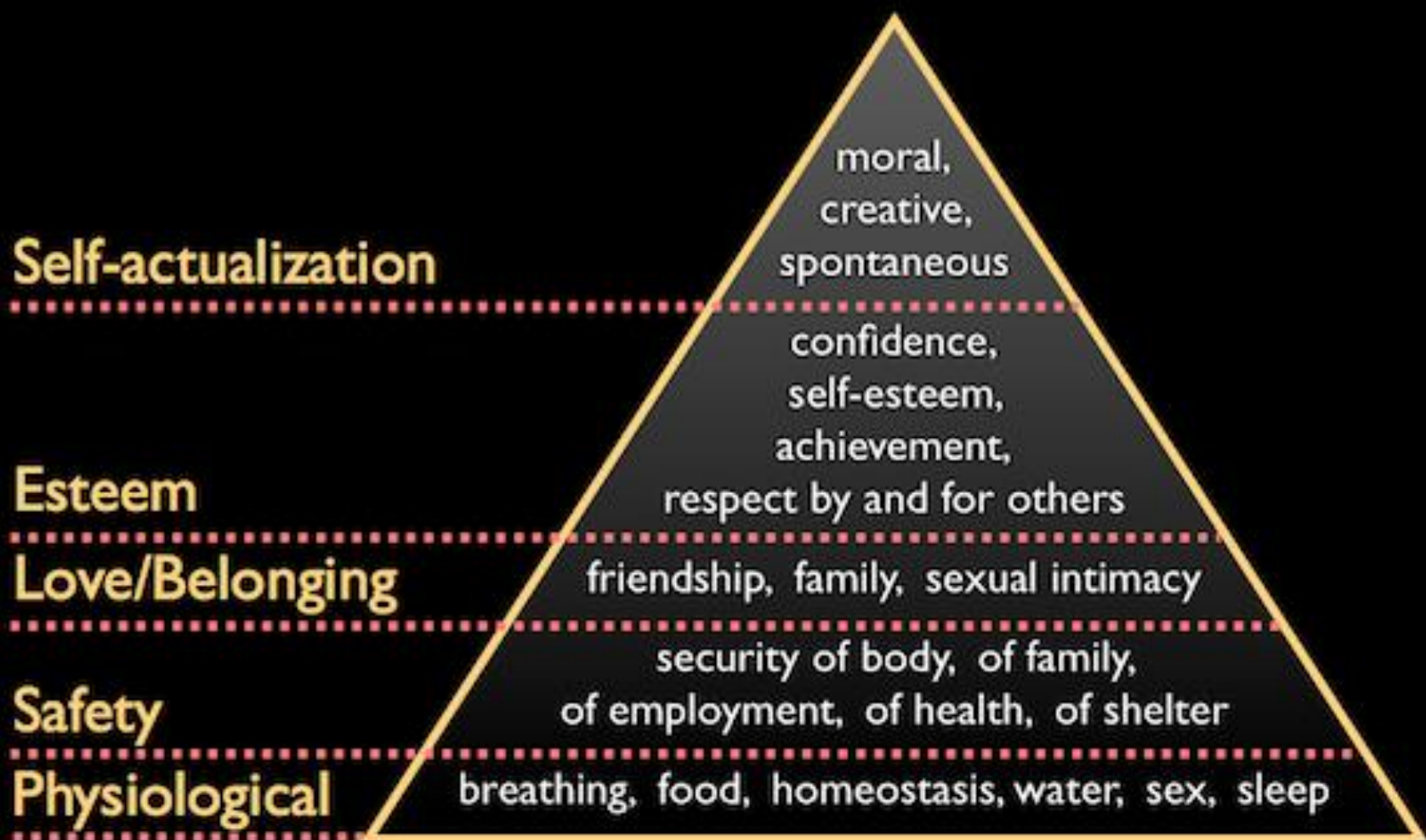










Photo credit: <http://www.thestar.com>

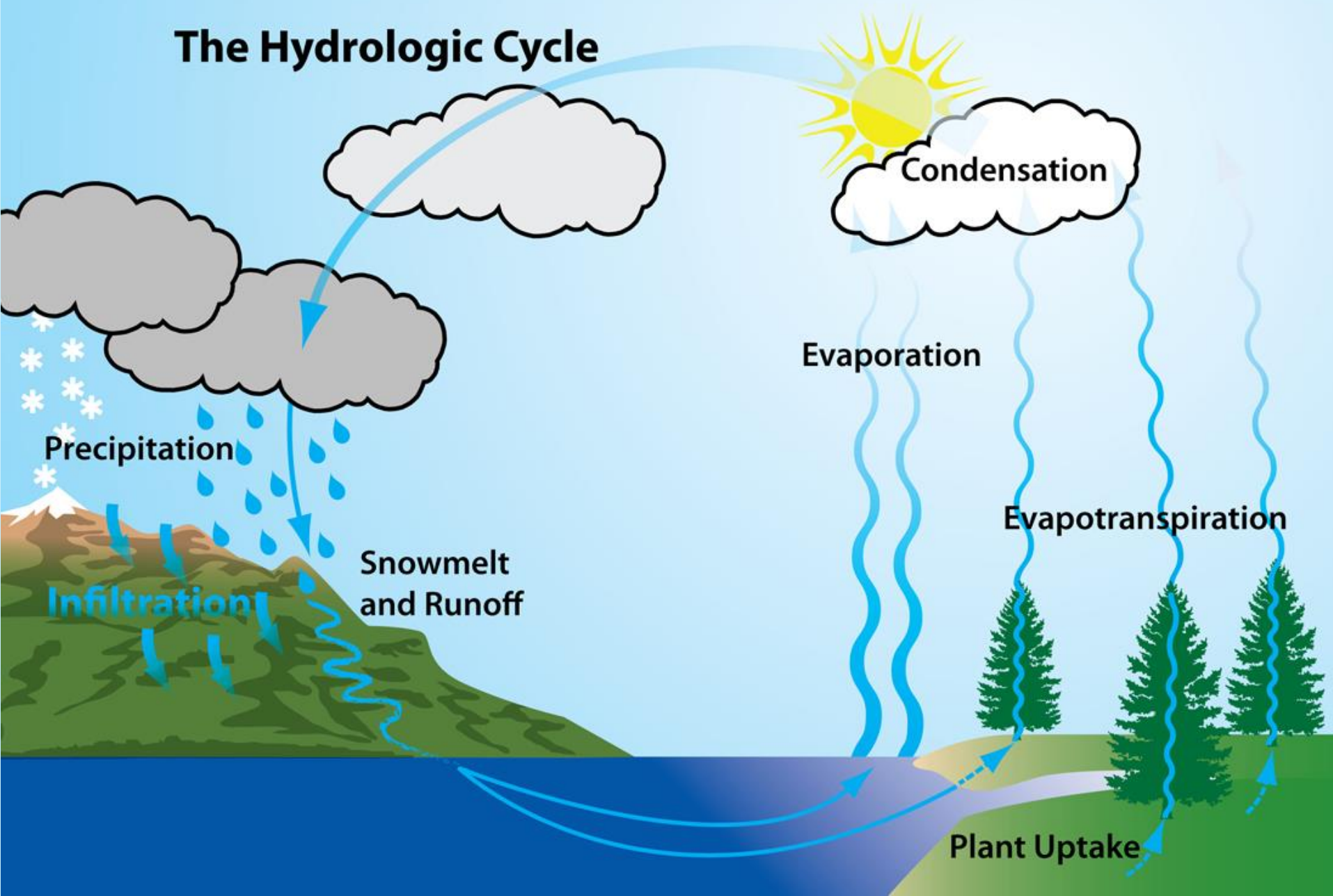




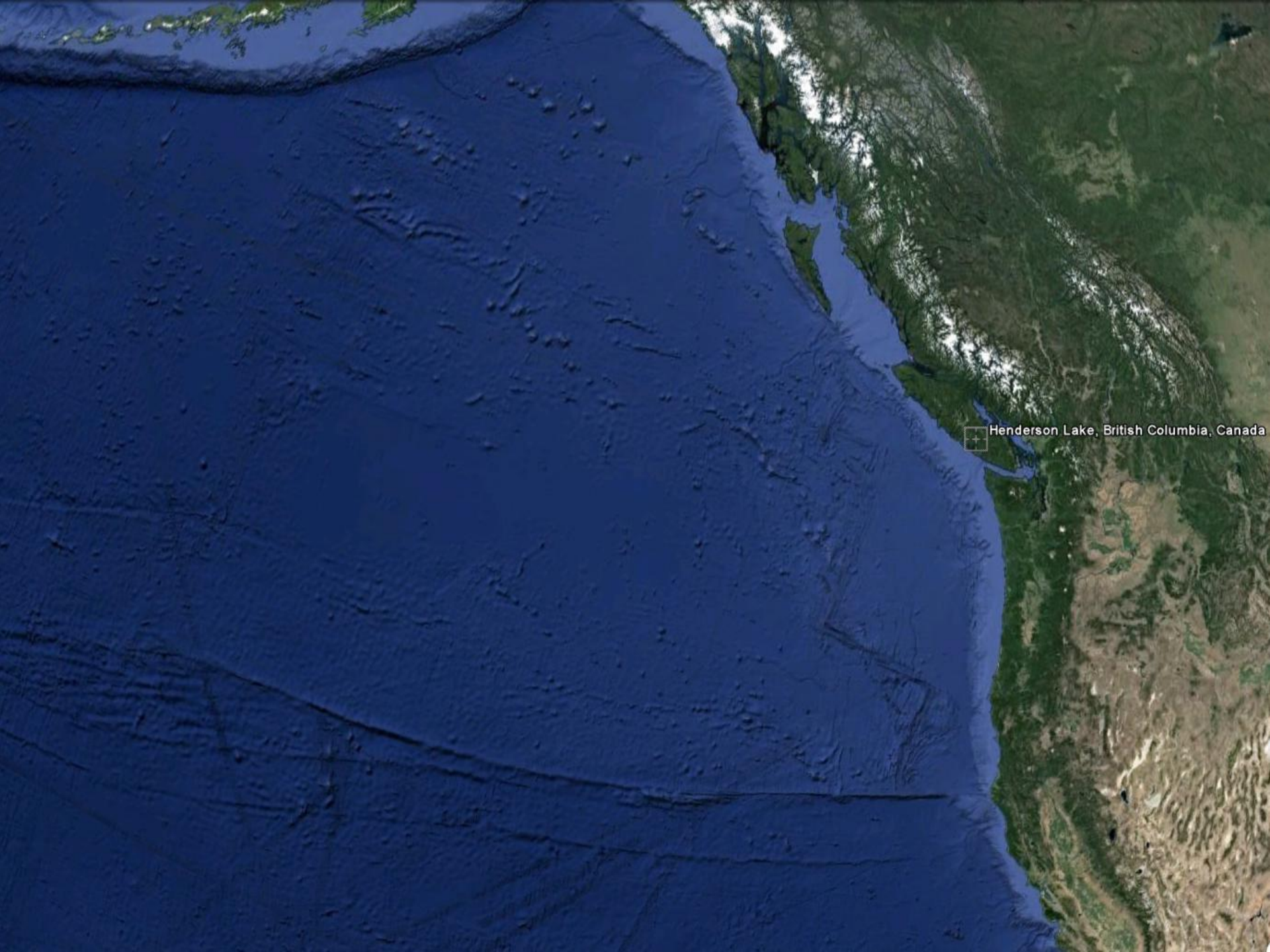


Photo credit: <http://i.telegraph.co.uk>

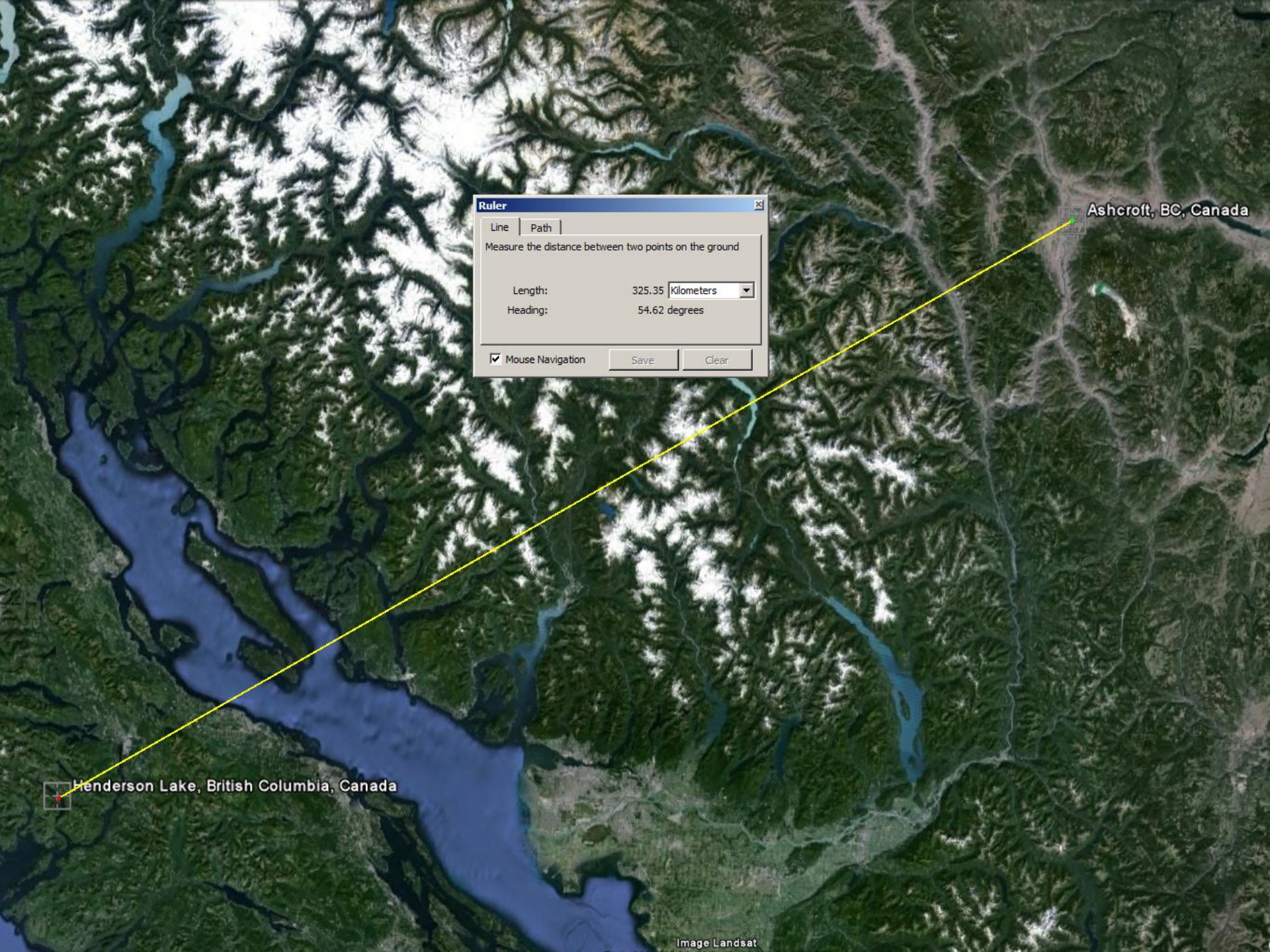
The Hydrologic Cycle







Henderson Lake, British Columbia, Canada



Ruler [X]

Line Path

Measure the distance between two points on the ground

Length: 325.35 Kilometers

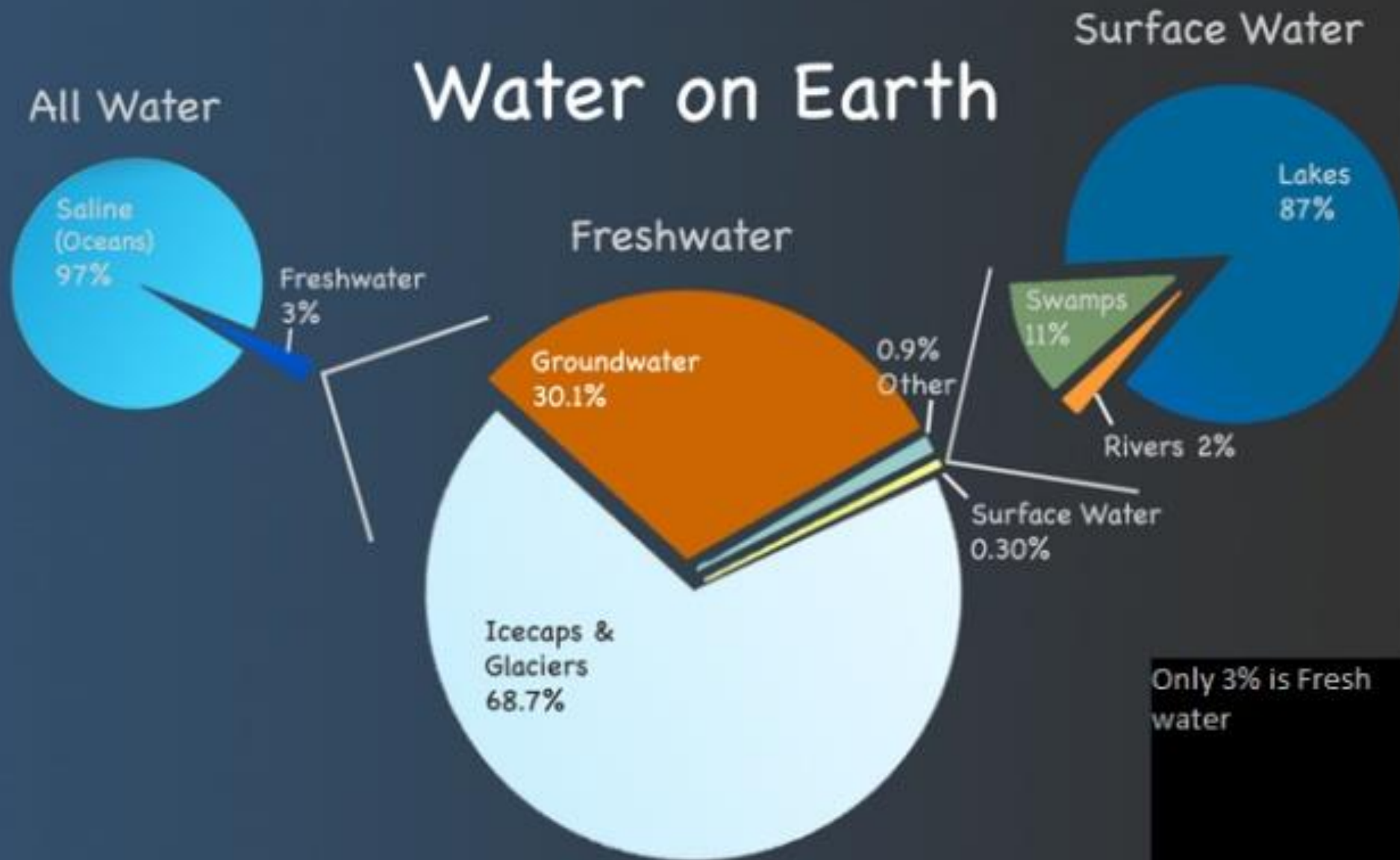
Heading: 54.62 degrees

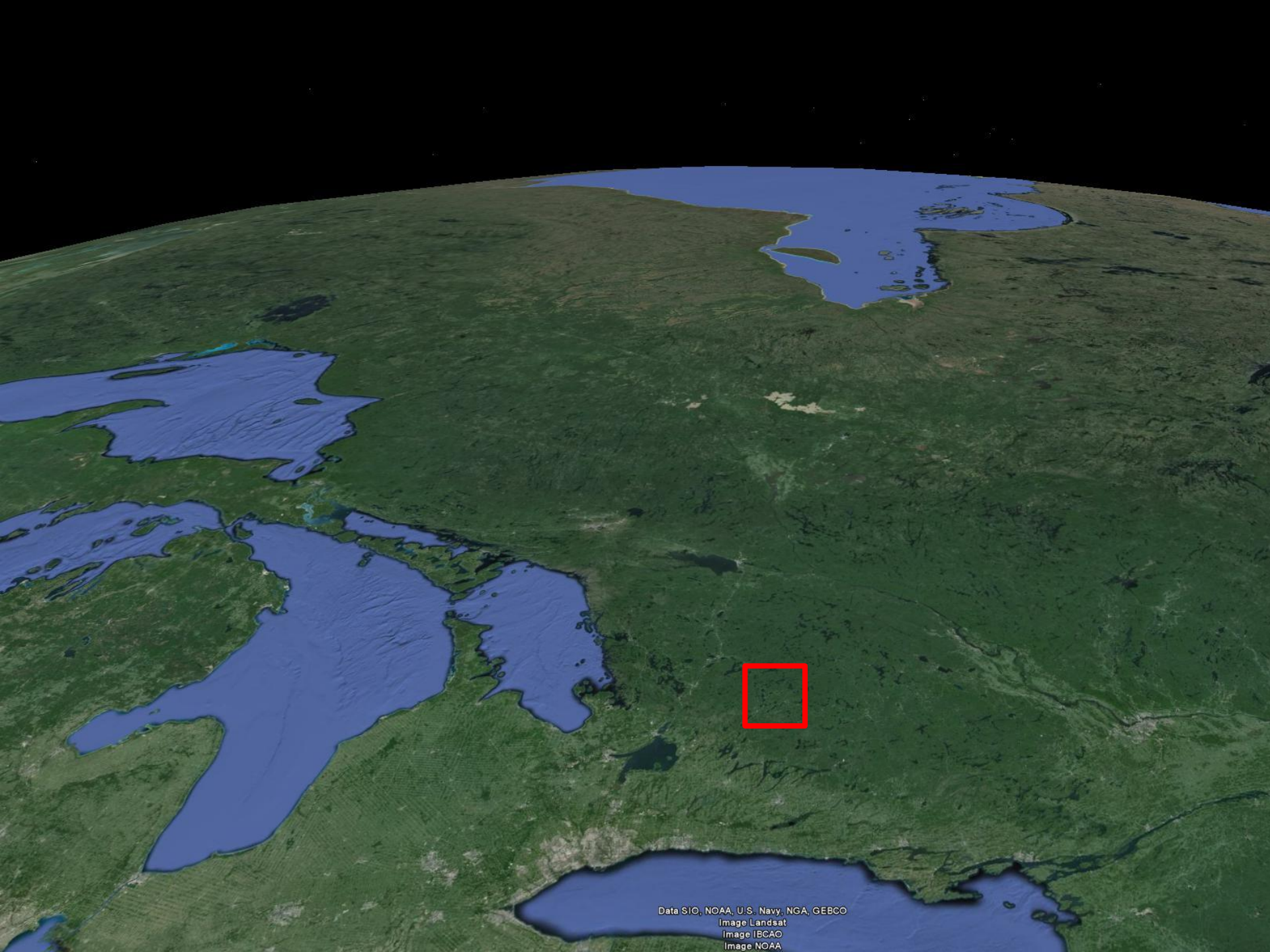
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Henderson Lake, British Columbia, Canada

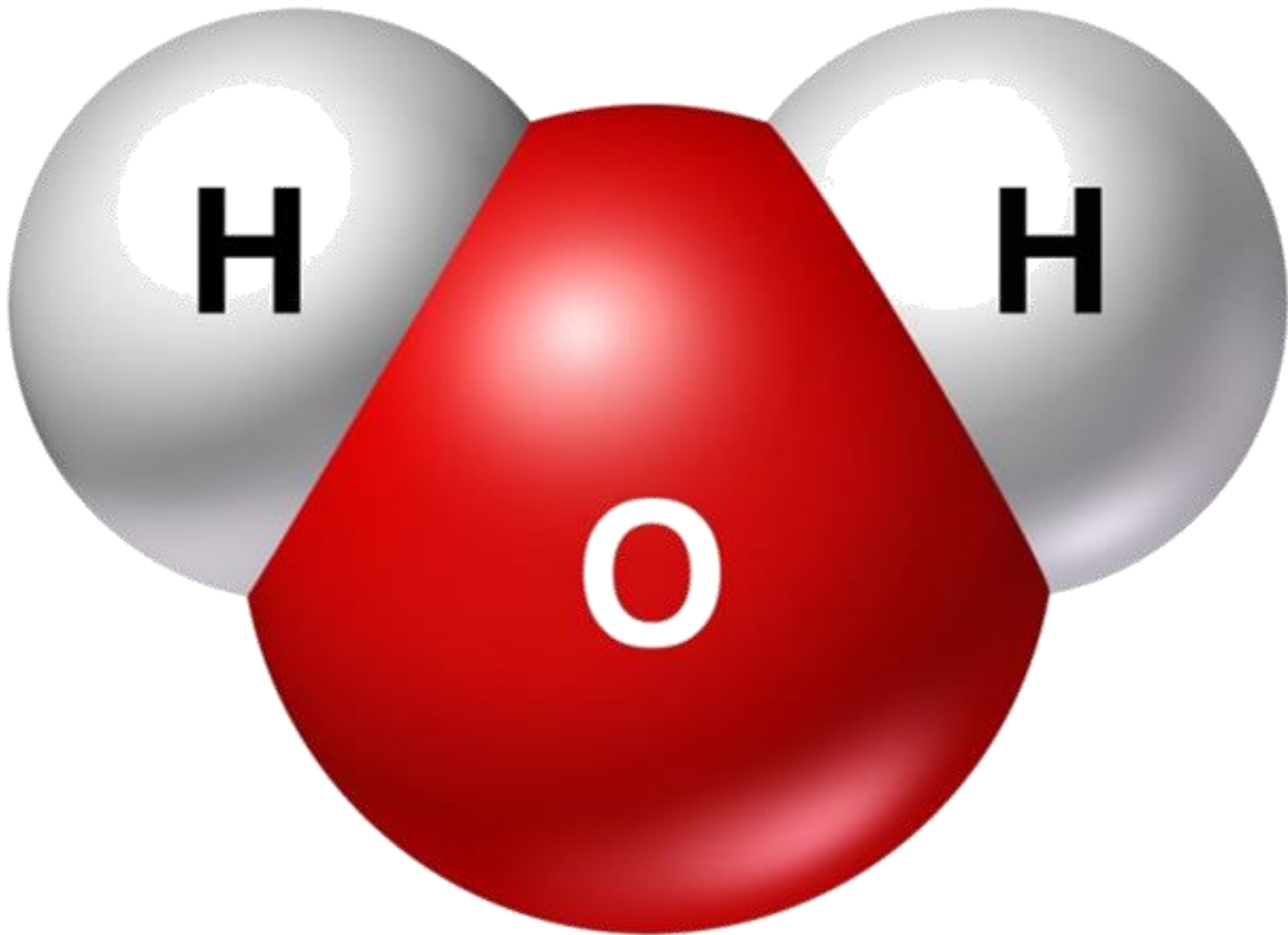
Ashcroft, BC, Canada

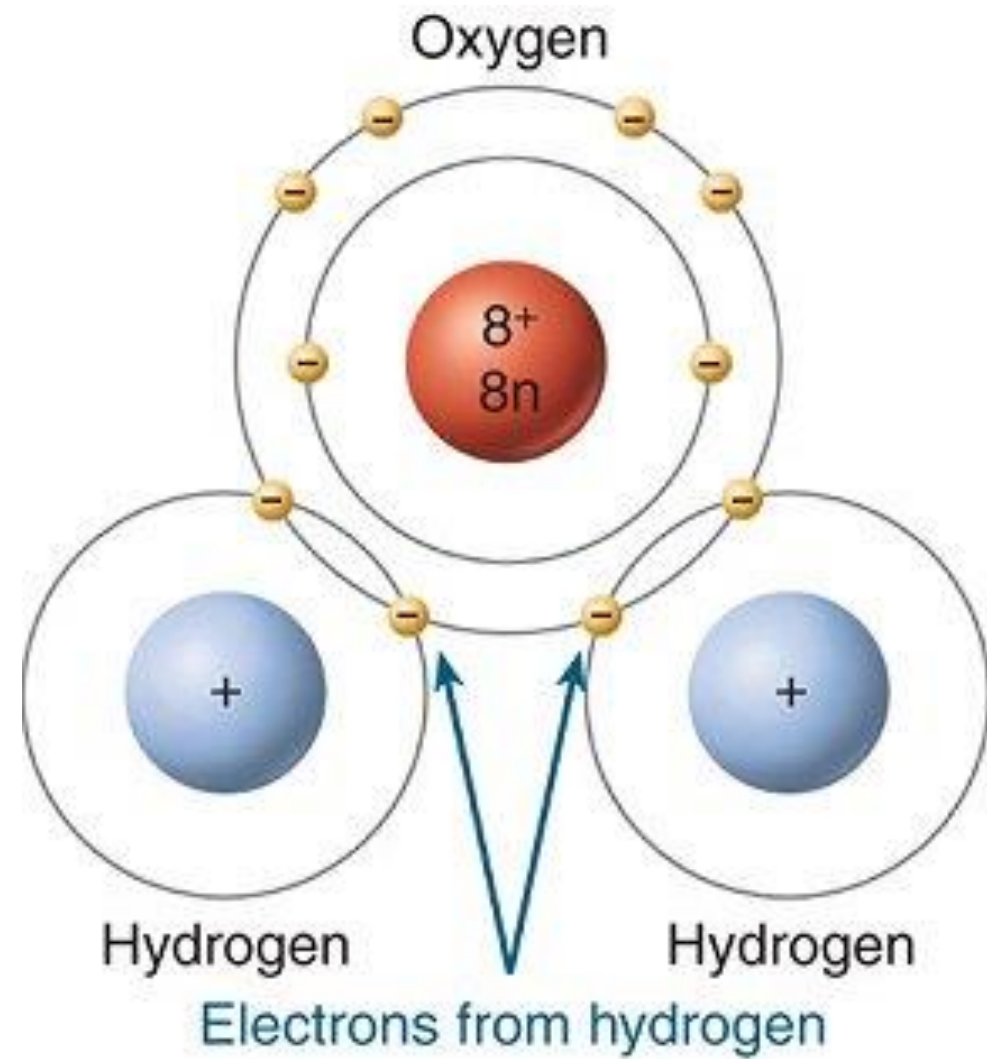
Water on Earth



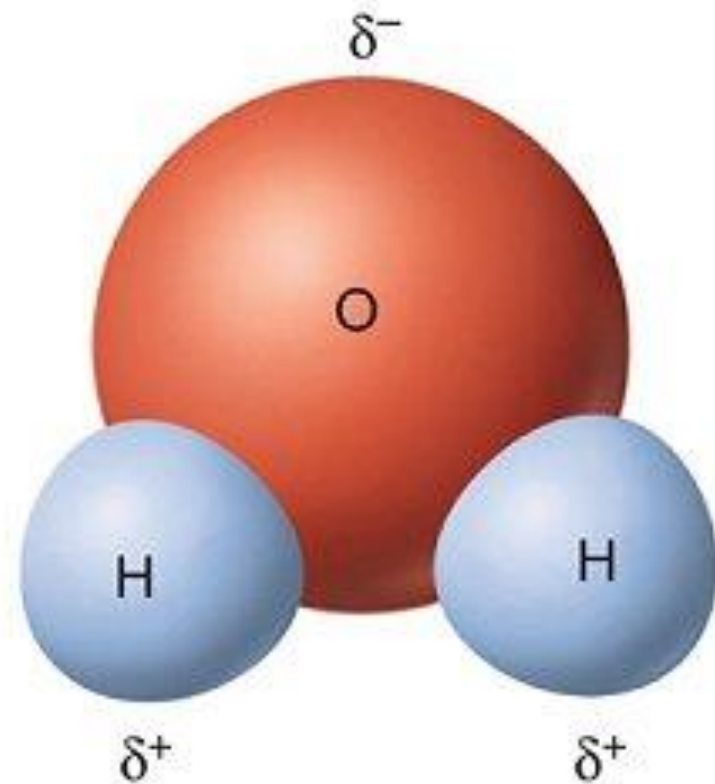


Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat
Image JRC
Image NOAA

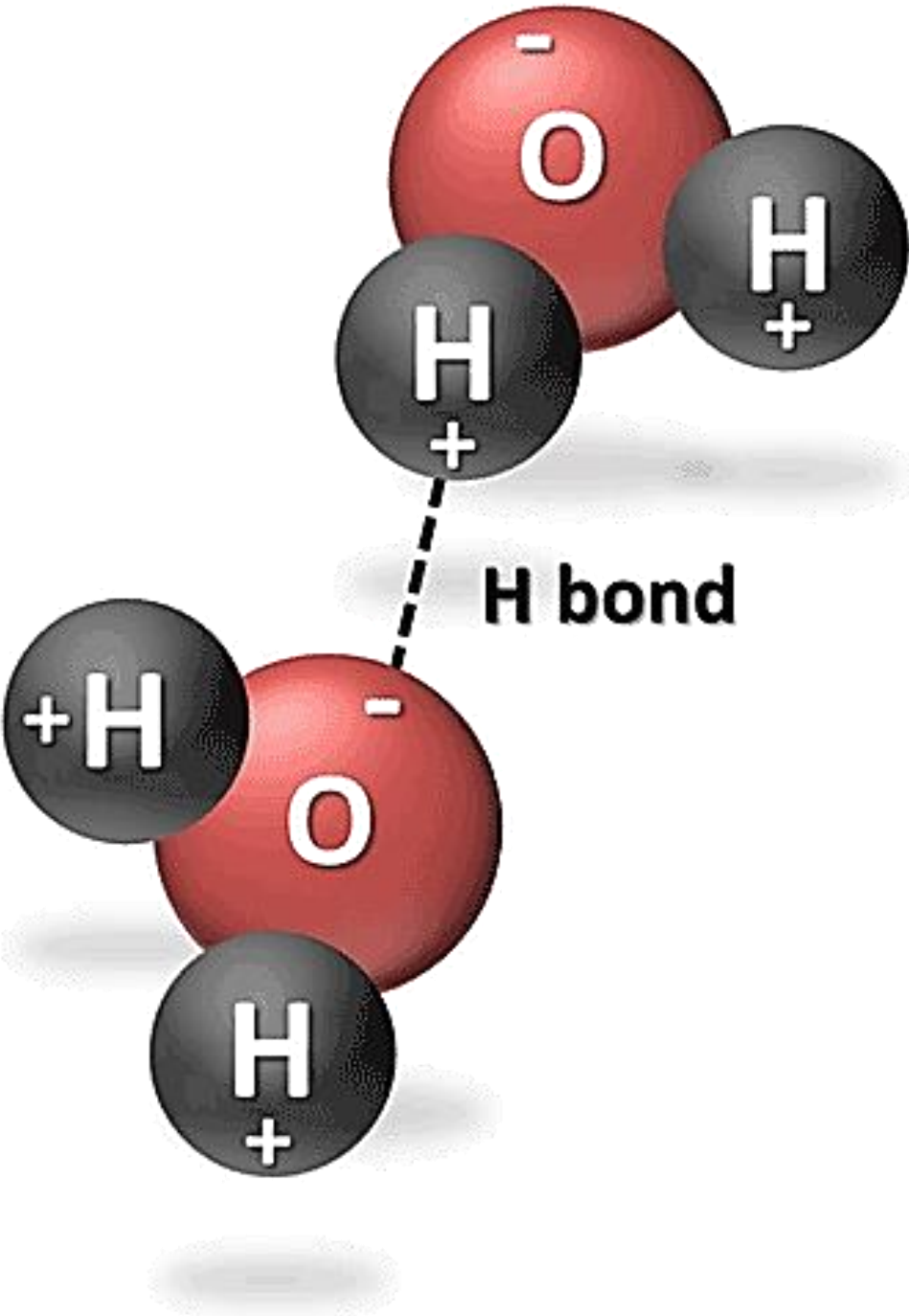




(a) Electron shells in a water molecule



(b) Distribution of partial charges in a water molecule



Properties of Water

Property	Explanation
Heat storage	Hydrogen bonds require considerable heat before they break, minimizing temperature changes.
Ice formation	Water molecules in an ice crystal are spaced relatively far apart because of hydrogen bonding.
High heat of vaporization	Many hydrogen bonds must be broken for water to evaporate.
Cohesion	Hydrogen bonds hold molecules of water together.
High polarity	Water molecules are attracted to ions and polar compounds.

Molecular weight	18.0148
Critical temperature	373.91 Celcius
Boiling point	100 Celcius
Freezing point	0 Celcius
Triple point temperature	0.01 Celcius
Triple point pressure	615.066 Pa

Ice density	918 kg/m ³
Maximum density	999 kg/m ³ (at 3.98 Celcius)
Viscosity (25 C)	0.889mN s/m ²
Surface tension (25 C)	72 mN/m



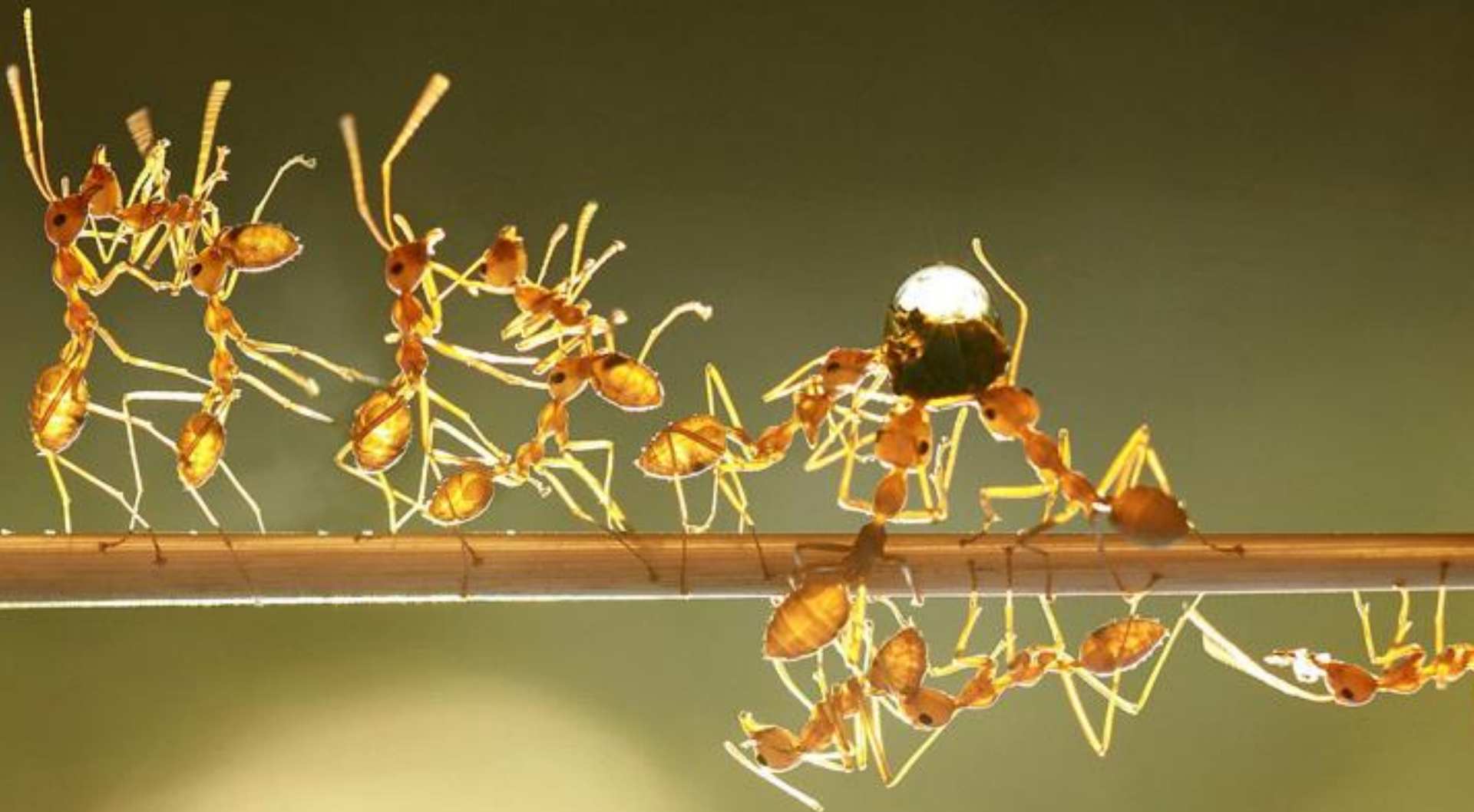


Photo credit: <http://i.telegraph.co.uk>

Heat capacity (25 C)	4.1796 kJ/kg·K
Velocity of sound (0 C)	1403 m/s
Electrical conductivity (25 C)	8 uS/m
Refractive index (25 C)	1.333

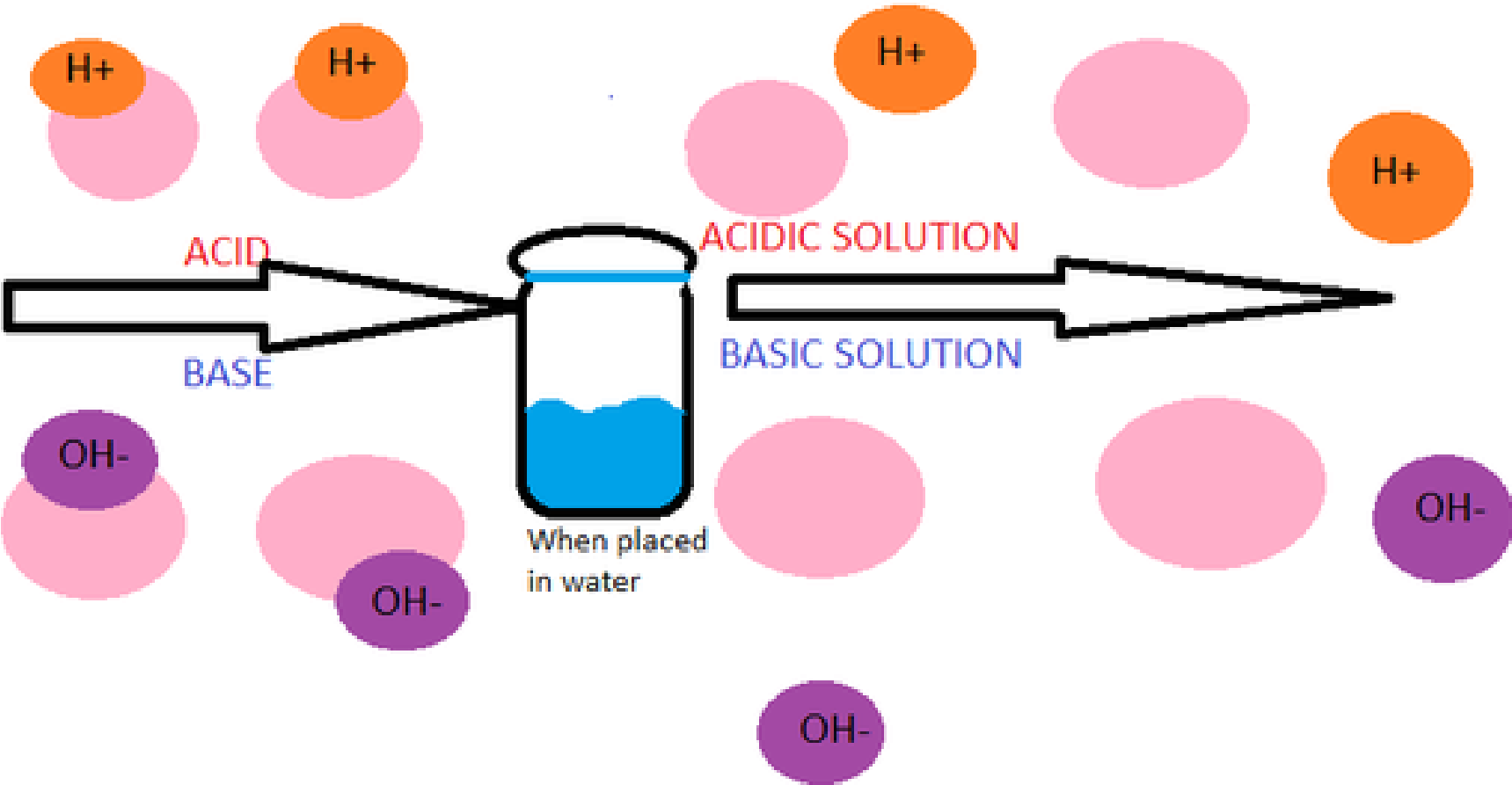
Stressor-based Indicators

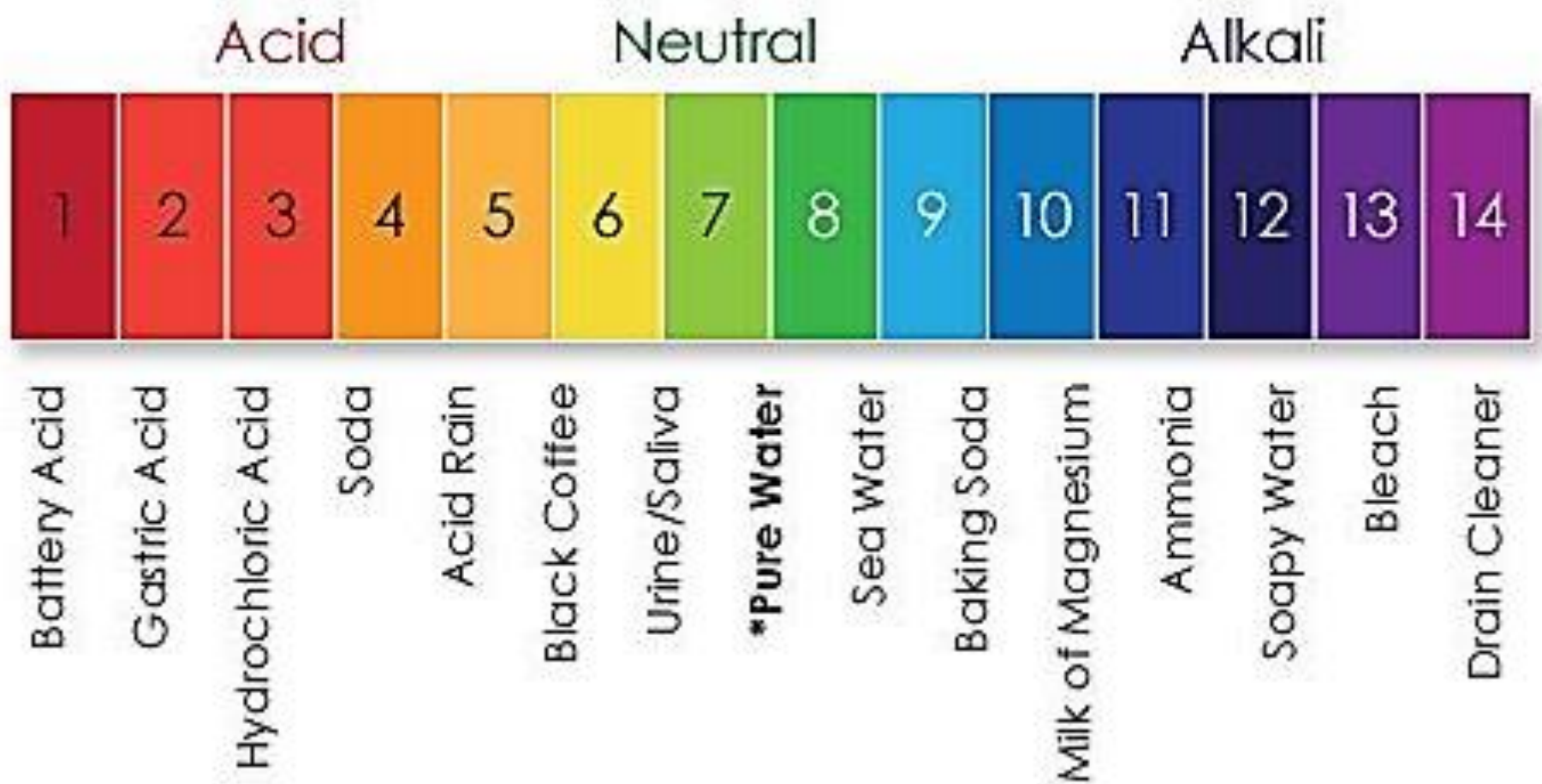


Effect-based Indicators (Bioindicators)



Photo credit: news.nationalgeographic.com







Analyte	Normal Lake Range	Relevance
Dissolved organic carbon (DOC)	1 – 20 mg/L (oligotrophic lake median: 2 mg/L; eutrophic lake median: 12 mg/L)	Food for microorganisms; colours water and influences heat uptake and stratification
Phosphorous	TP <5 mg/L (ultraoligotrophic) – >100 µg/L (hypereutrophic)	An important nutrient. Photosynthetic productivity usually limited by P. Addition stimulates algae and plant growth
Nitrogen (nitrate, ammonia, organic nitrogen)	Inorganic N <200 mg/m ³ (ultraoligotrophic) – >1500 mg/m ³ (hypereutrophic) Organic N <200 mg/m ³ (ultraoligotrophic) – >1200 mg/m ³ (hypereutrophic)	Naturally occurring nutrients. Excessive amounts can stimulate algae and plant growth. Some forms are toxic in high concentrations.

Analyte	Normal Lake Range	Relevance
Calcium	Hardwater >20 mg/L Softwater < 20 mg/L Seasonably variable	Essential nutrient (component of cell membranes and hard exoskeletons)
Dissolved oxygen	From saturation (~ 12 mg/L); Dynamics and concentration driven by stratification, in combination with atmospheric and photosynthetic inputs and losses from chemical and biological oxidation	Vital for energy production via cellular respiration; concentration affects solubility of many inorganic nutrients





Photo credit: <http://endthelie.com>



1. The ecosystem is the primary user of water.
2. Water is a public trust; its distribution for consumptive uses must equally benefit everyone
3. We have a right to sufficient potable water and a responsibility to ensure that everyone has access to it.
4. We have a responsibility to conserve freshwater and to prevent or reverse its degradation.
5. We have a responsibility to monitor state of freshwater
6. Monitoring data must be analyzed, interpreted and reported without interference from special interest groups, or shifting political ideologies.
7. Traditional knowledge of Aboriginal peoples must be considered when developing water policy.











