

“LAKE EFFECT” FALL CLIMATE



A photograph showing a man in a dark winter jacket and hat standing in a massive snowdrift. The snow is piled high, reaching up to his chest. In the background, there are buildings and bare trees, suggesting a winter setting. The overall scene is dominated by the white snow.

SYRACUSE

**“LAKE EFFECT”
SNOW STORMS**

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SC

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GREAT LAKES REGION

“LAKE EFFECT”
SPRING CLIMATE

“LAKE EFFECT” SPRING CLIMATE

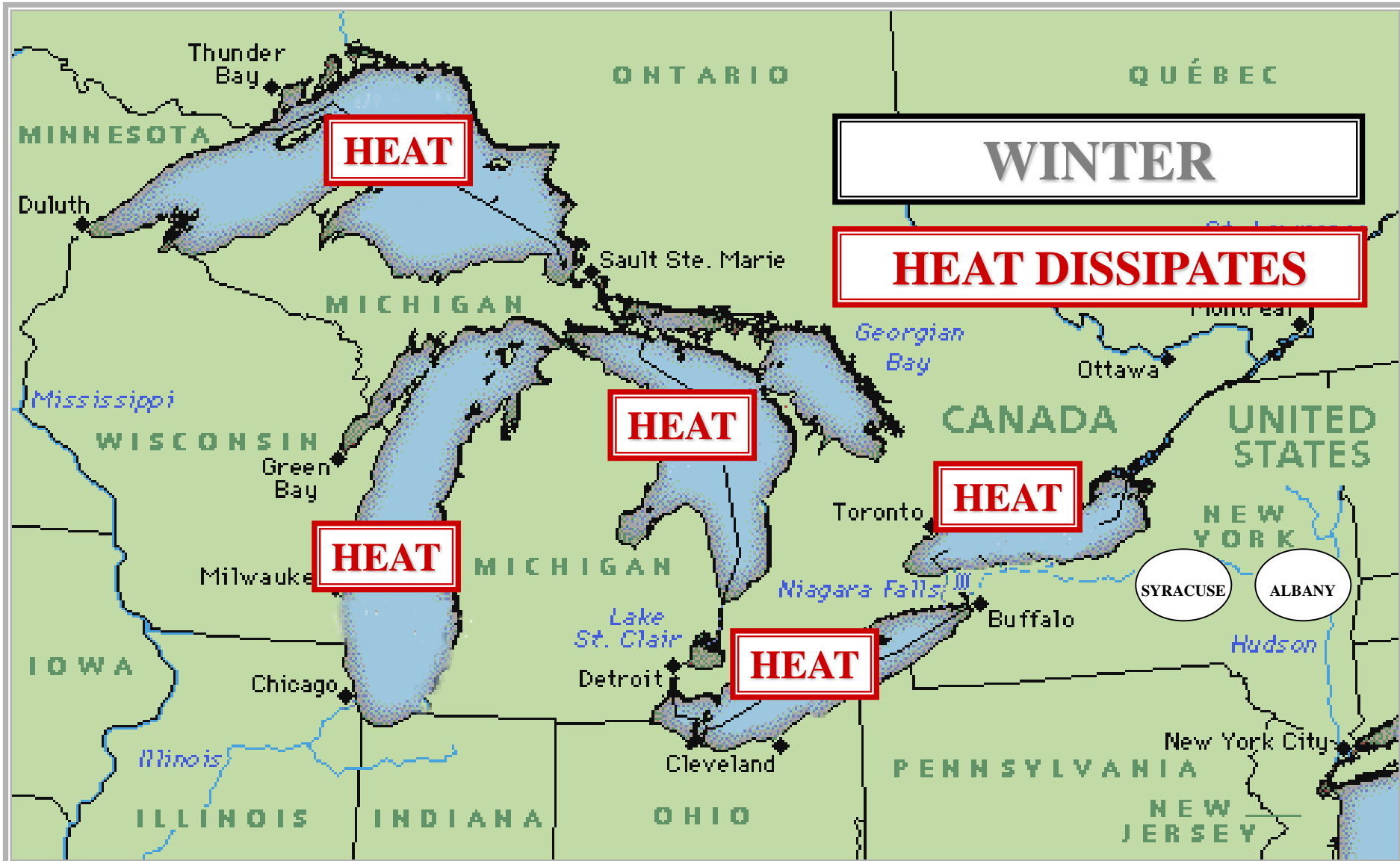


“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE

SP



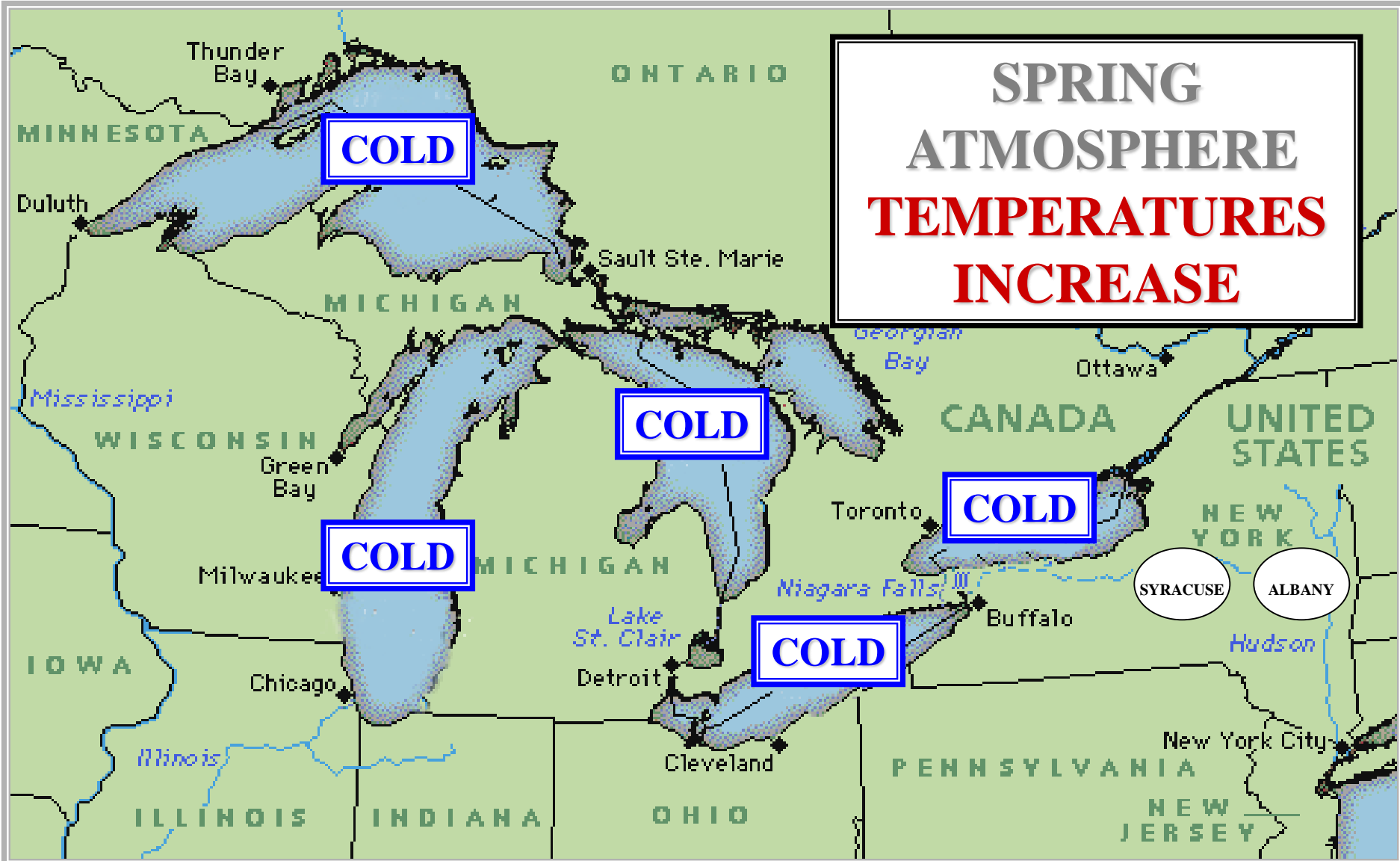
“LAKE EFFECT” SPRING CLIMATE



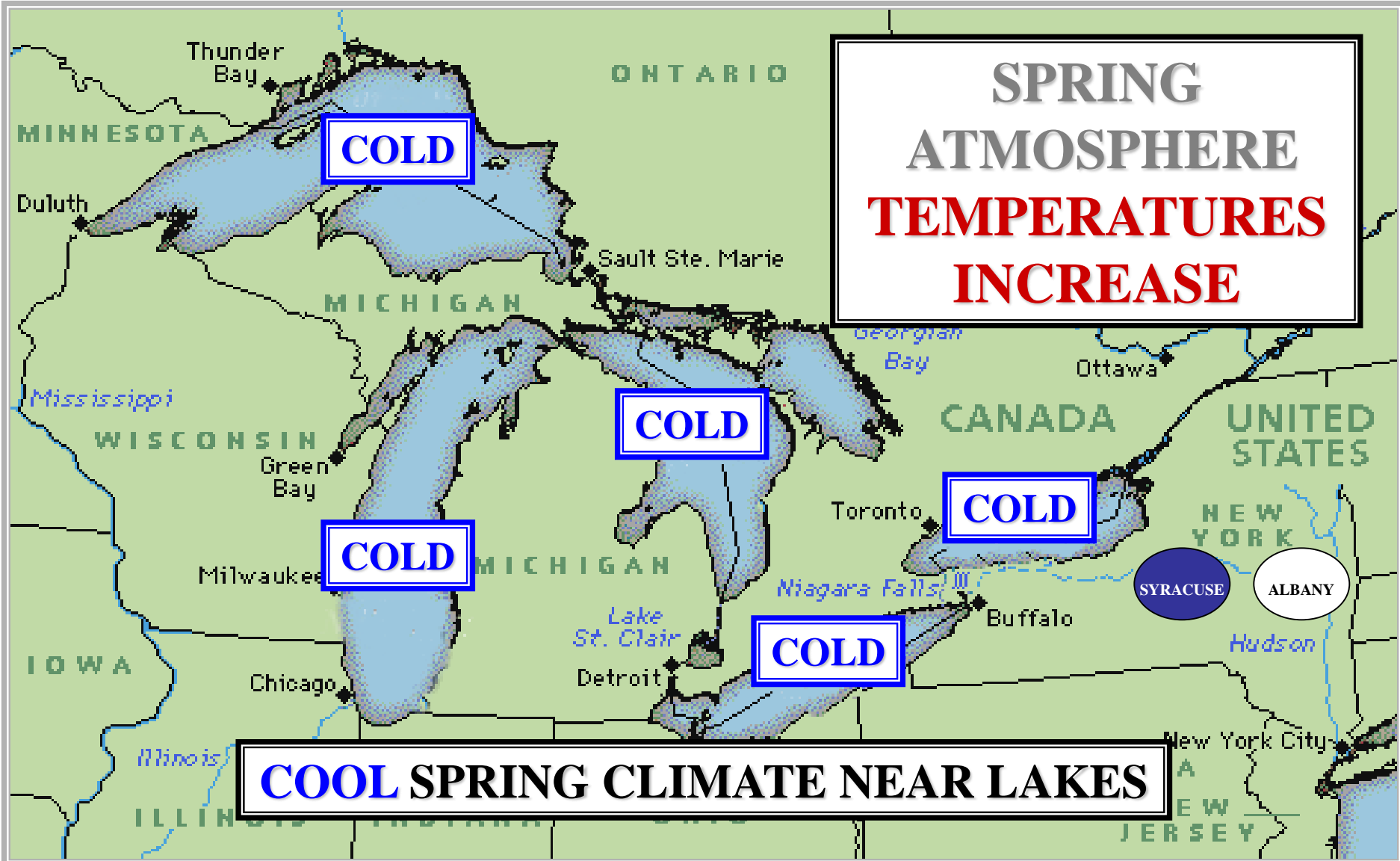
“LAKE EFFECT” SPRING CLIMATE



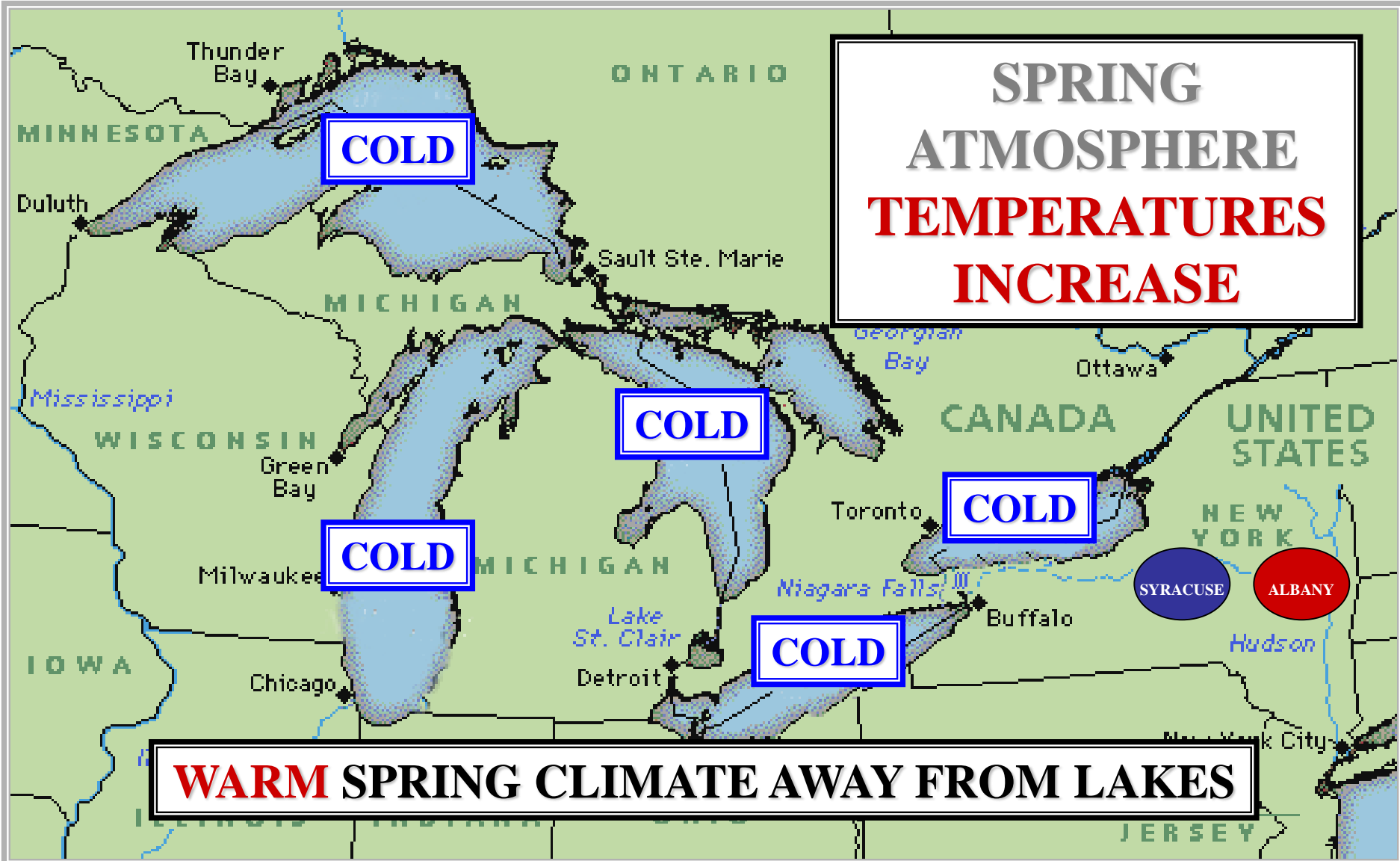
“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE





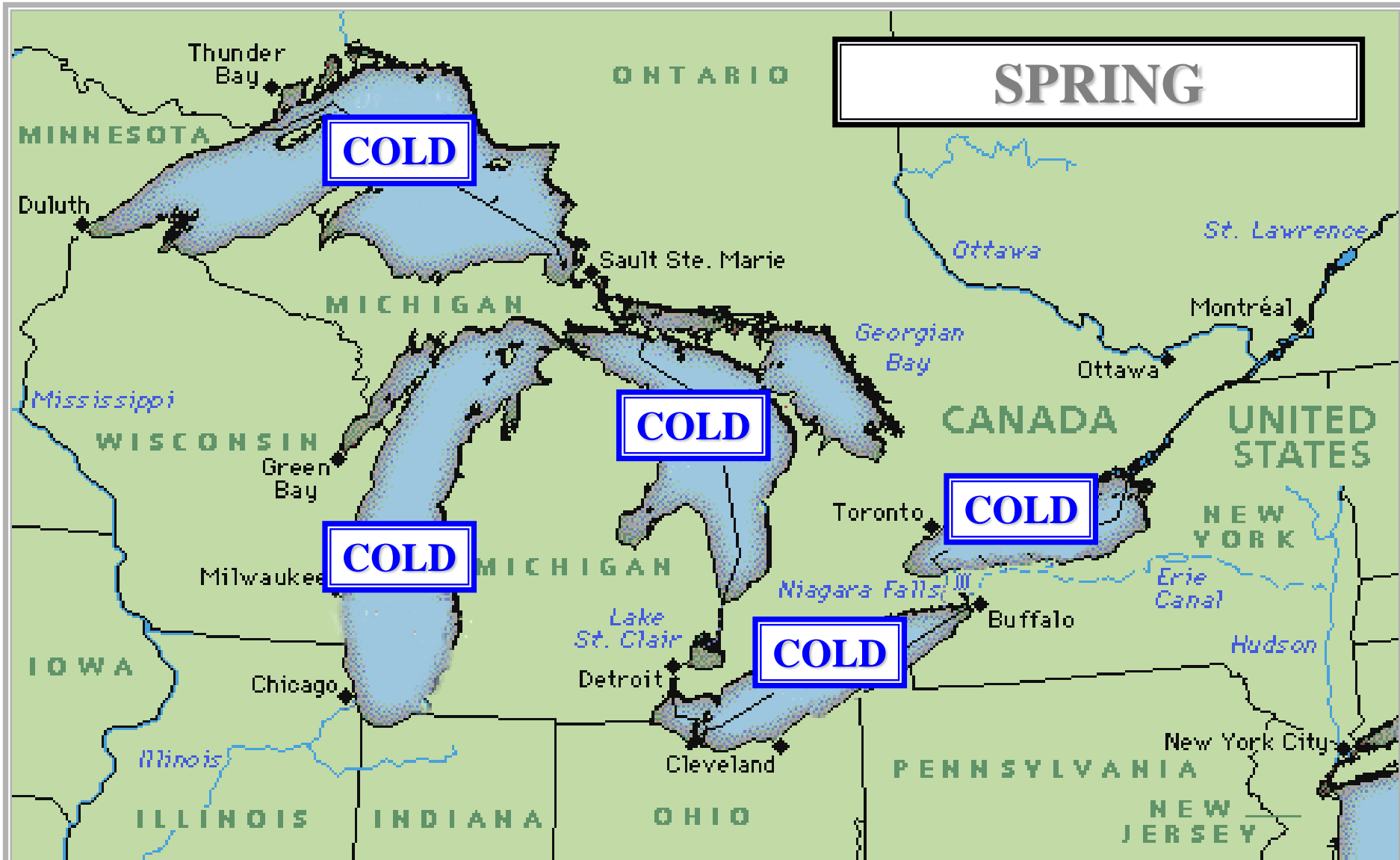
GREAT LAKES REGION

“LAKE EFFECT”

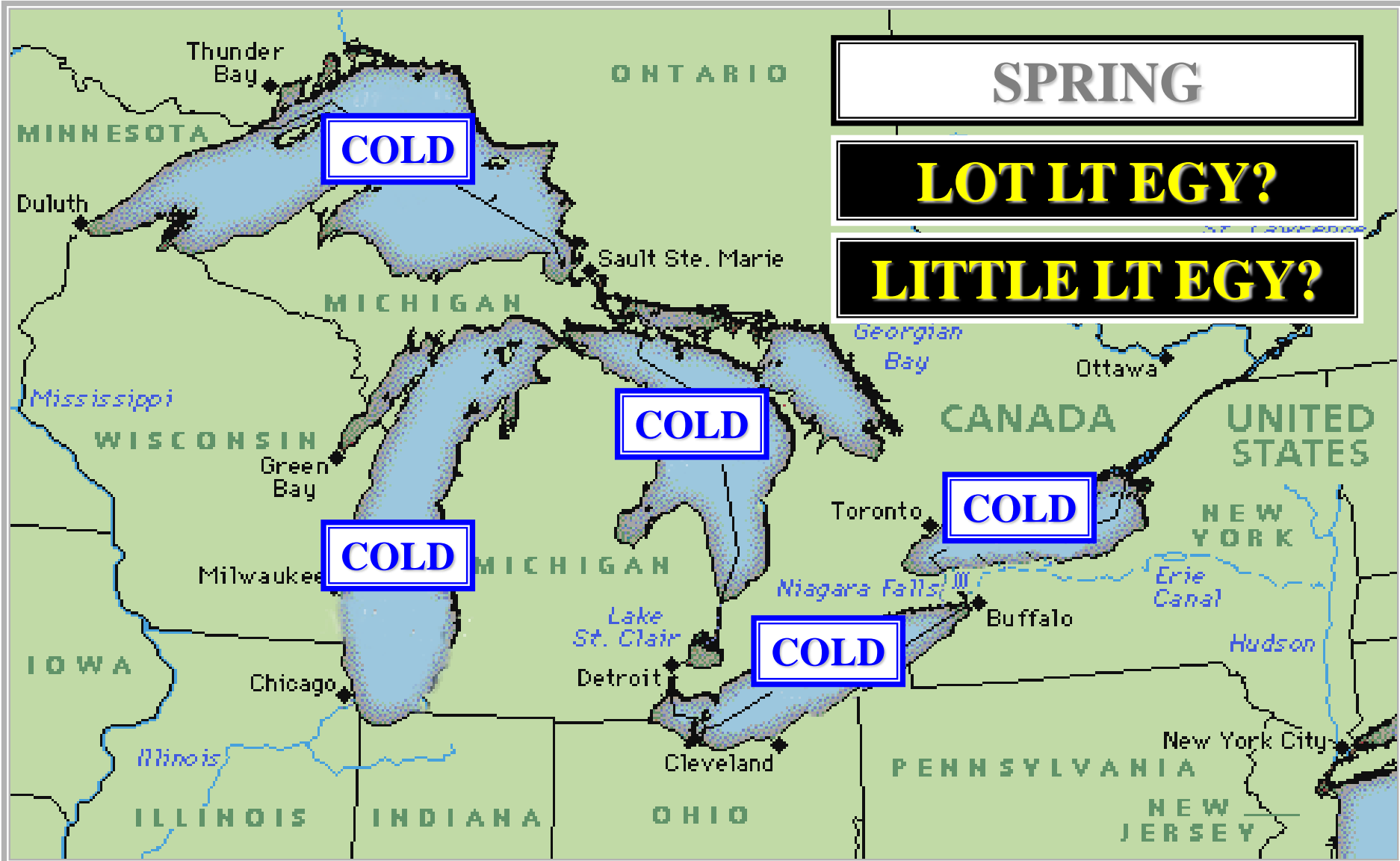
NEAR LAKES

COOL SPRINGS

“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE



“LAKE EFFECT” SPRING CLIMATE



WATER MOLECULES

**WATER
HIGH SPECIFIC
HEAT**

- CHARGE

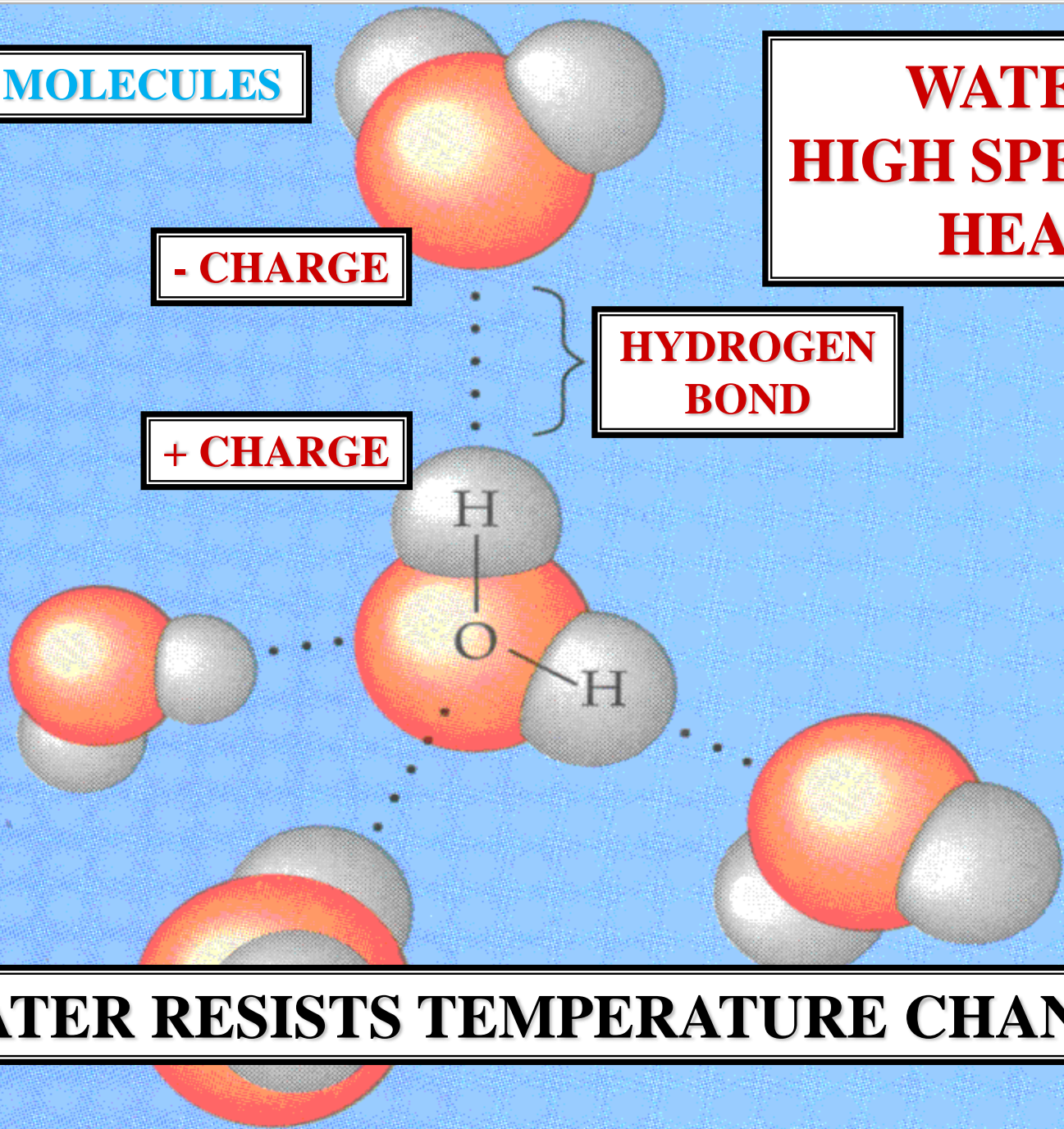
+ CHARGE

**HYDROGEN
BOND**

i

H

WATER RESISTS TEMPERATURE CHANGE



WATER MOLECULES

**WATER
HIGH SPECIFIC
HEAT**

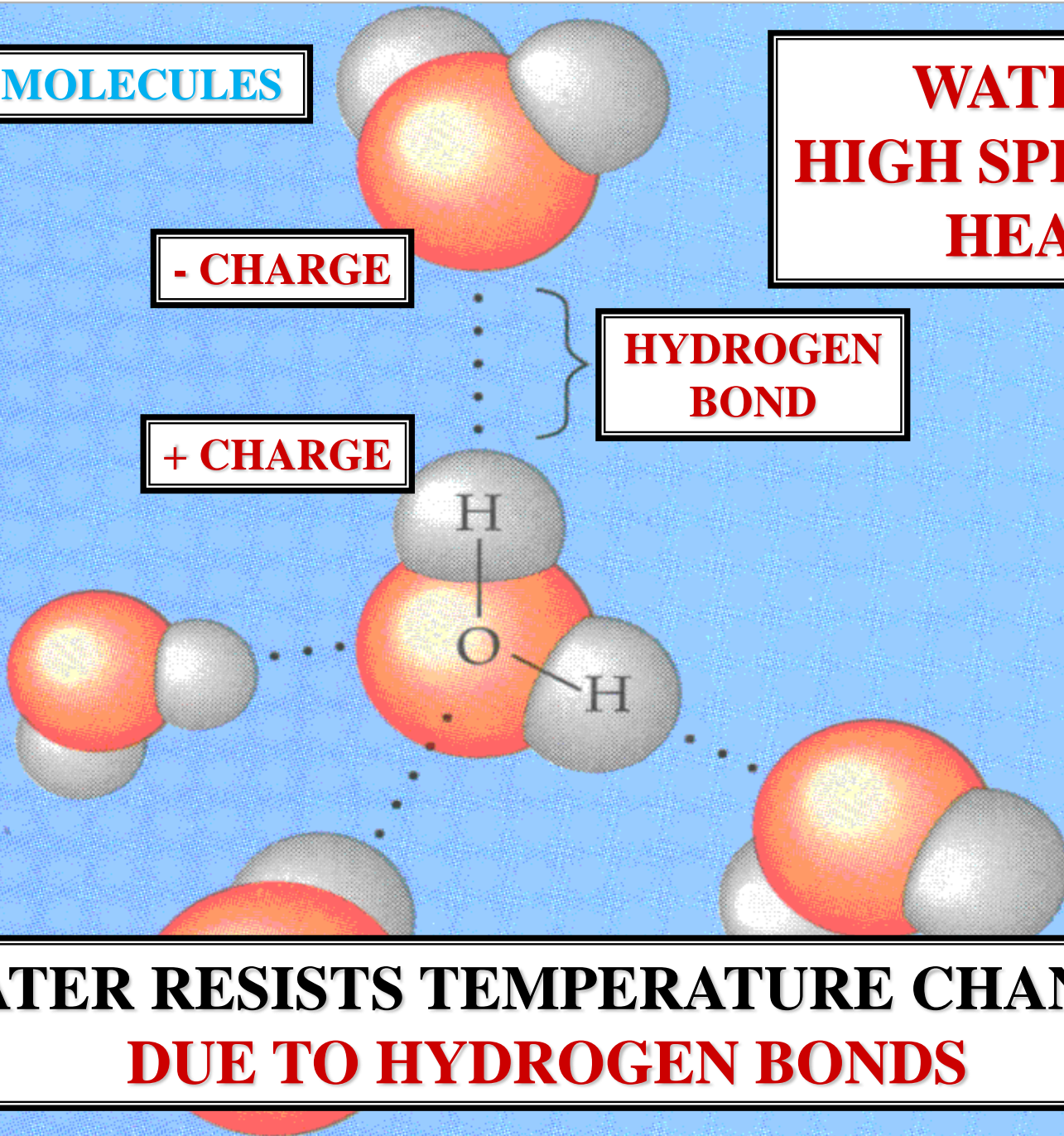
- CHARGE

+ CHARGE

**HYDROGEN
BOND**



**WATER RESISTS TEMPERATURE CHANGE
DUE TO HYDROGEN BONDS**



WATER BIO-IMPORTANT PROPERTIES



**WATER'S HIGH
SPECIFIC HEAT
REGULATES
EARTH'S
TEMPERATURE**

WATER BIO-IMPORTANT PROPERTIES

HEAT EVAPORATION

HEAT EVAPORATION



HEAT EVAPORATION

HEAT ABSORBED BY LIQUID
TO CHANGE 1 G TO THE
GAS STATE

HEAT EVAPORATION

**HEAT
EVAPORATION
WATER: APPLIED**

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

HE

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

5

HEAT EVAPORATION

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

^

E

540 CAL / G

EVAPORATE

**IT TAKES 540 CALORIES
TO EVAPORATE
1 G OF WATER**

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

HE

540 CAL / G

EVAPORATE

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

2

540 CAL / G

HEAT EVAPORATION

EVAPORATE

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

?

540 CAL / G

270 CAL / G

EVAPORATE

EVAPORATE

**IT TAKES 270 CALORIES
TO EVAPORATE
1 G OF ETHANOL**



QUESTION

**WHICH OF THE
PRECEDING WATER
OR ETHANOL RESISTS
EVAPORATION?**

QUESTION

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL



540 CAL / G

270 CAL / G

EVAPORATE

EVAPORATE

HEAT EVAPORATION: APPLIED

1G WATER

1G ETHANOL

?

2

540 CAL / G

270 CAL / G

EVAPORATE

EVAPORATE

WATER

RESISTS EVAPORATION

QUESTION

**WHICH OF THE
PRECEDING WATER
OR ETHANOL RESISTS
EVAPORATION?**

QUESTION

ANSWER

WATER

ANSWER

WATER MOLECULES

**WATER
HIGH HEAT
EVAPORATION**

- CHARGE

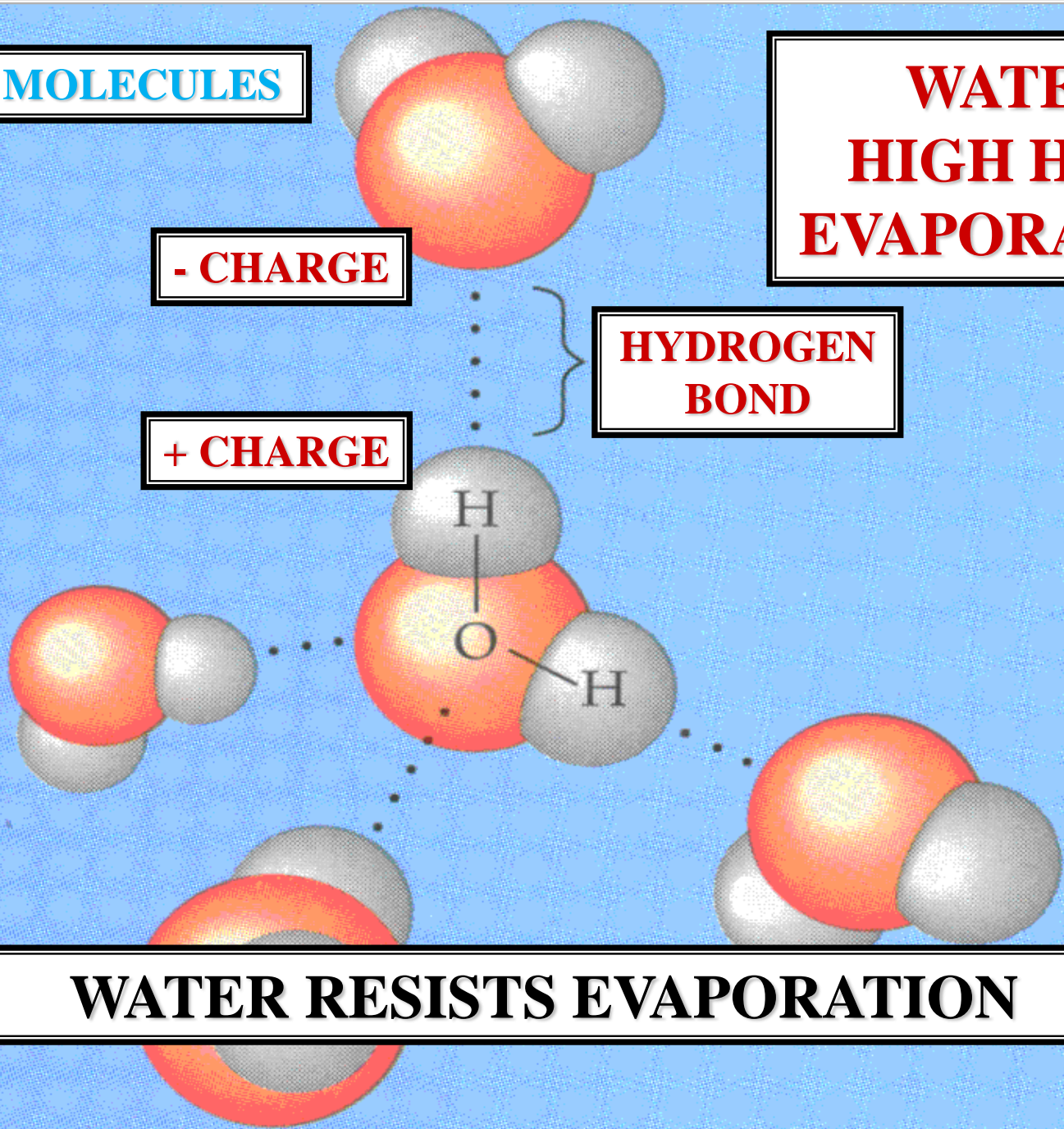
+ CHARGE

**HYDROGEN
BOND**

i

H

WATER RESISTS EVAPORATION



WATER MOLECULES

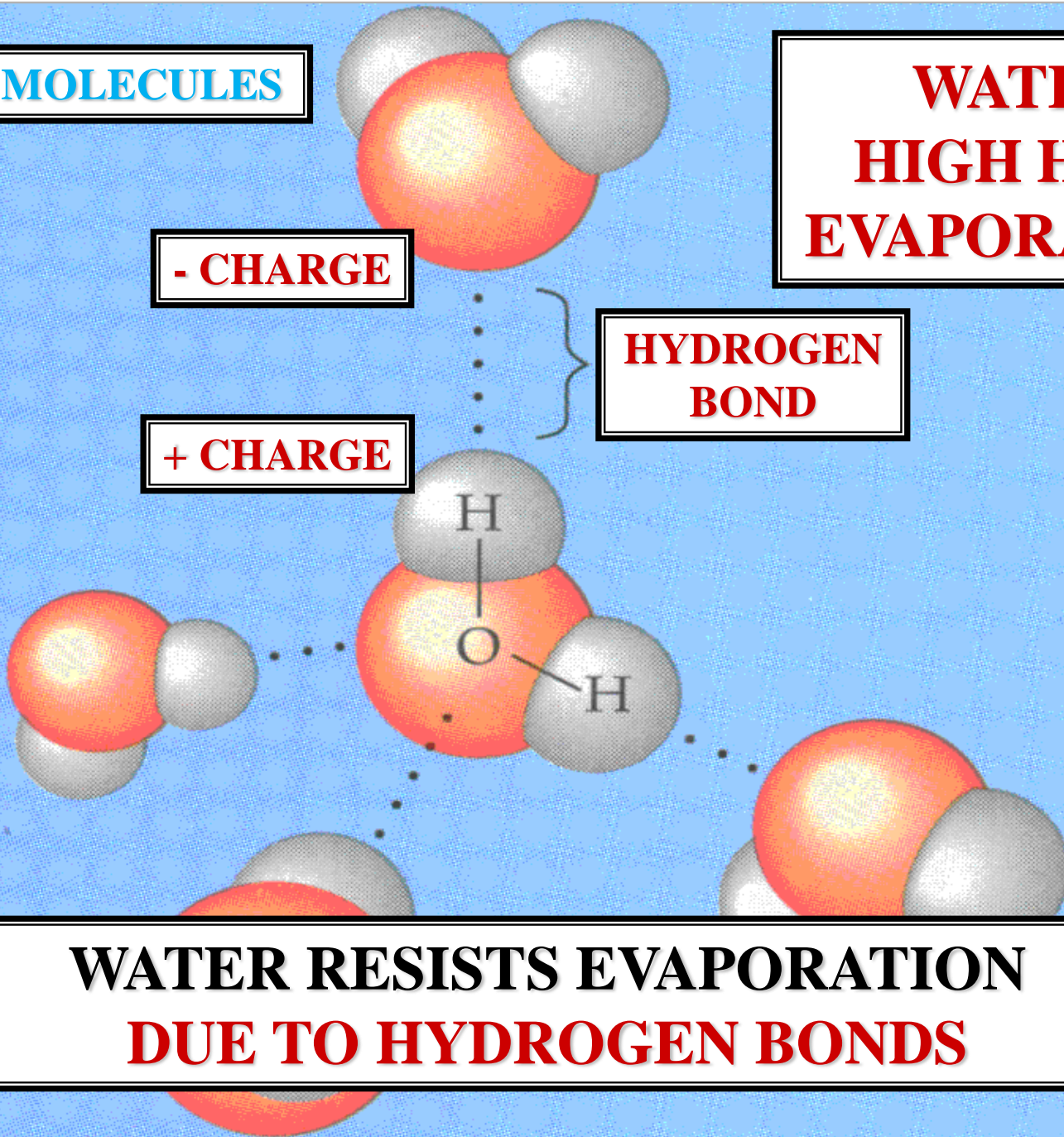
**WATER
HIGH HEAT
EVAPORATION**

- CHARGE

+ CHARGE

**HYDROGEN
BOND**

?



**WATER RESISTS EVAPORATION
DUE TO HYDROGEN BONDS**

QUESTION

**WATER REQUIRES A LOT
OF ENERGY TO
EVAPORATE.**

TRUE OR FALSE?

QUESTION

ANSWER




TRUE

ANSWER



HE

**WATER REQUIRES A LOT
OF ENERGY TO
EVAPORATE**

A high-speed photograph of a single water droplet falling into a pool of water, creating a series of concentric ripples. The background is a solid, vibrant blue. The text is overlaid on the center of the image.

**WATER
HIGH
HEAT EVAPORATION**

WATER'S HIGH

HEAT

EVAPORATION

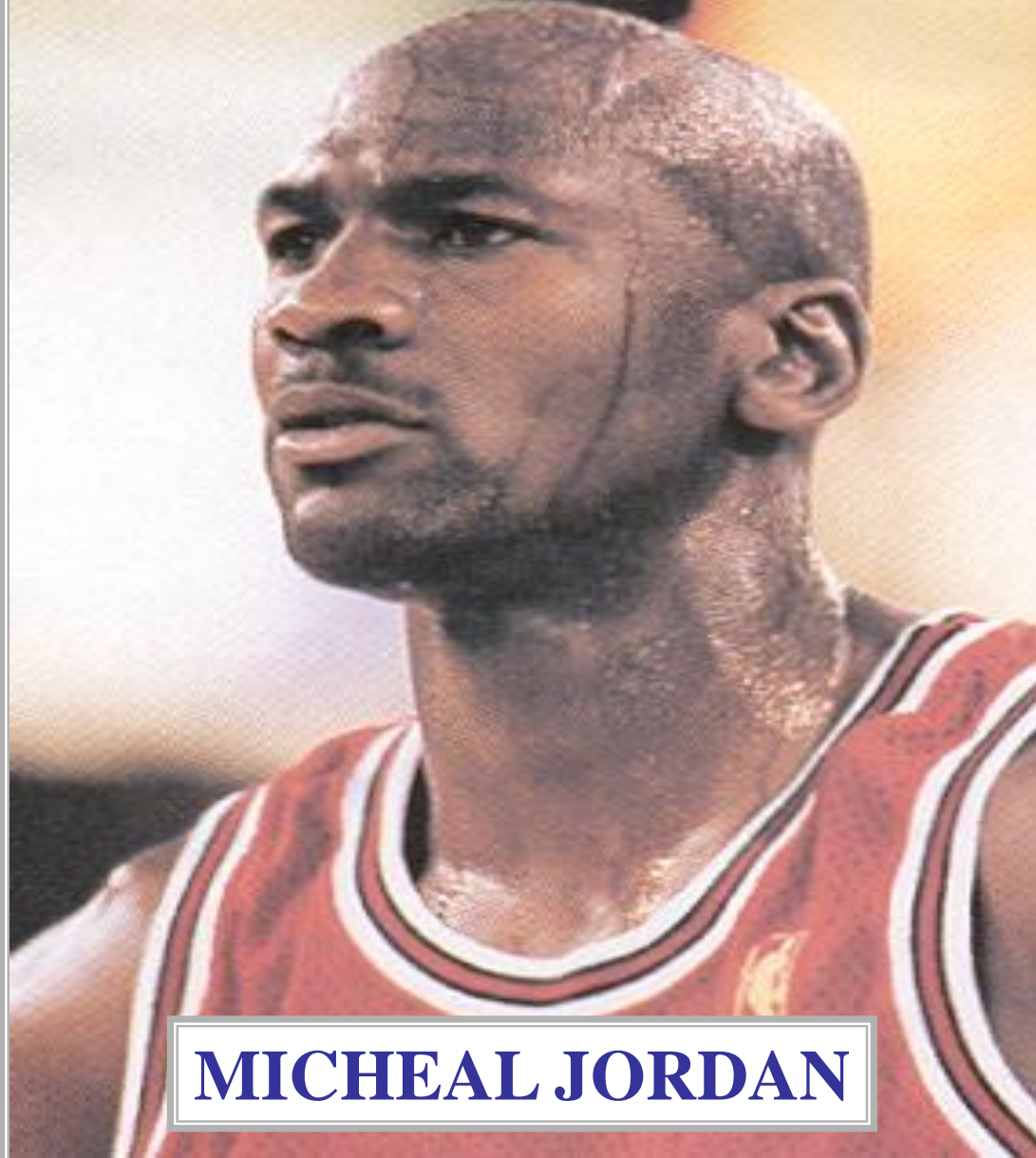
HUMAN

METABOLISM

APPLIED

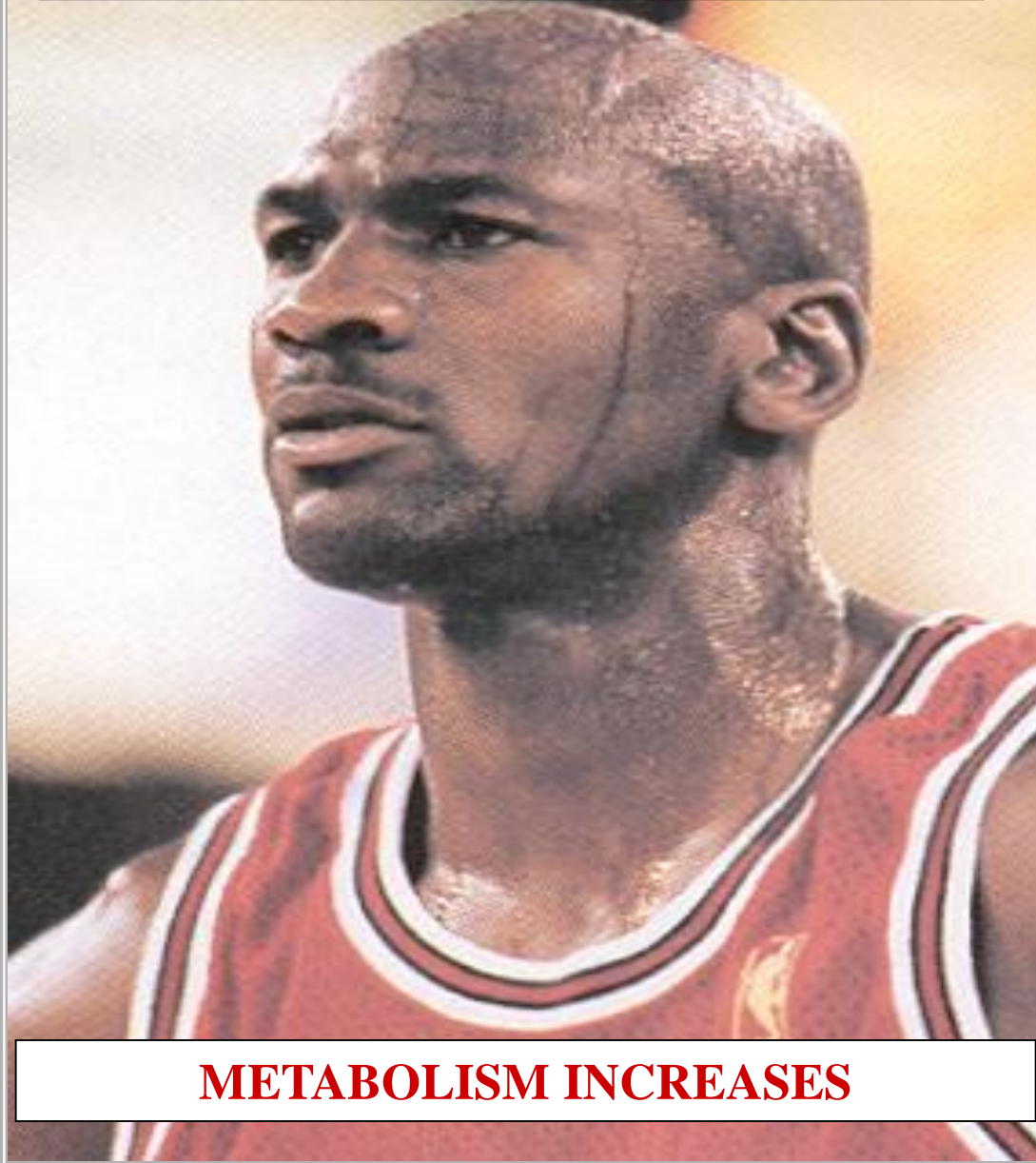


HUMAN METABOLISM



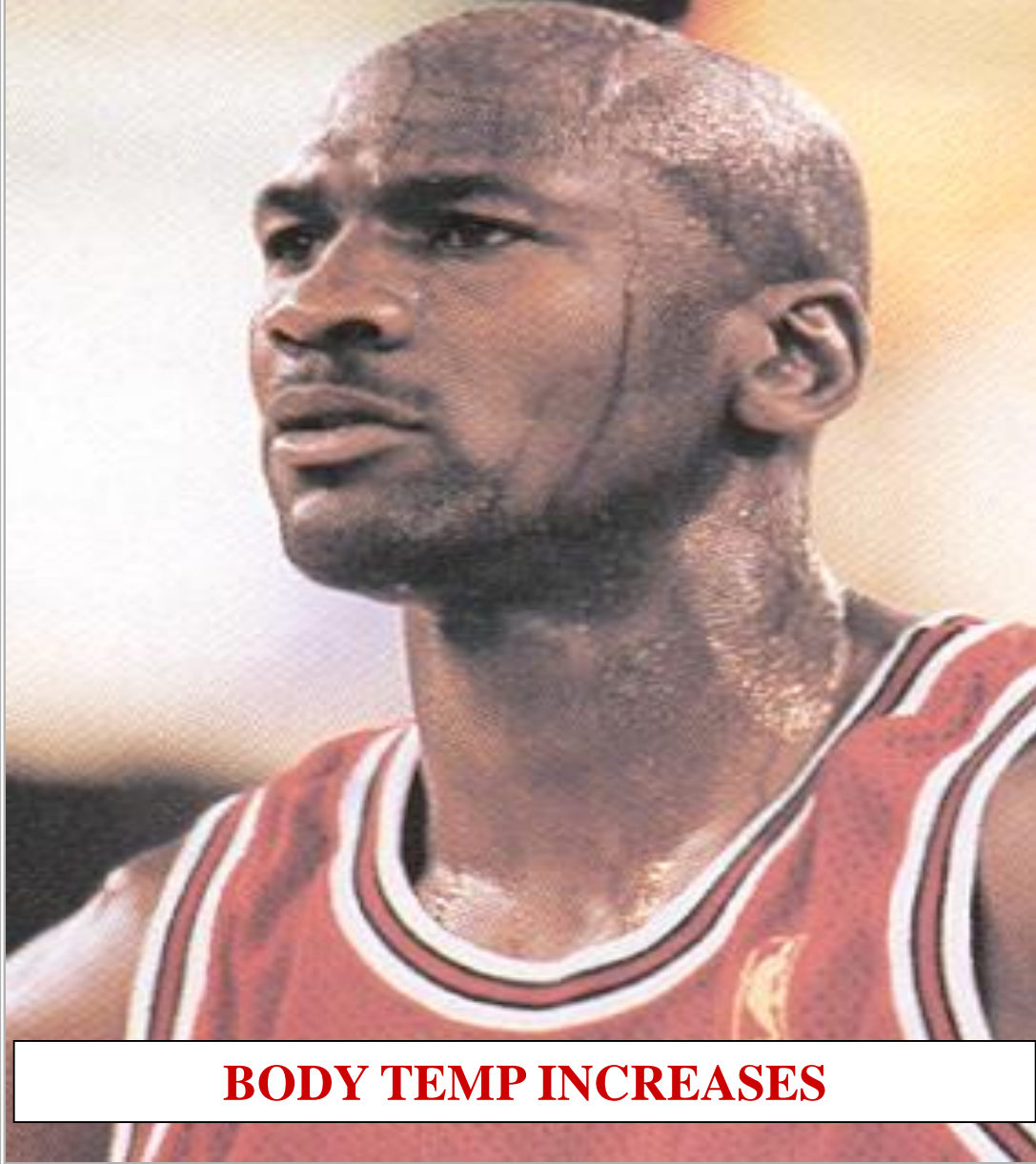
MICHEAL JORDAN

HUMAN METABOLISM



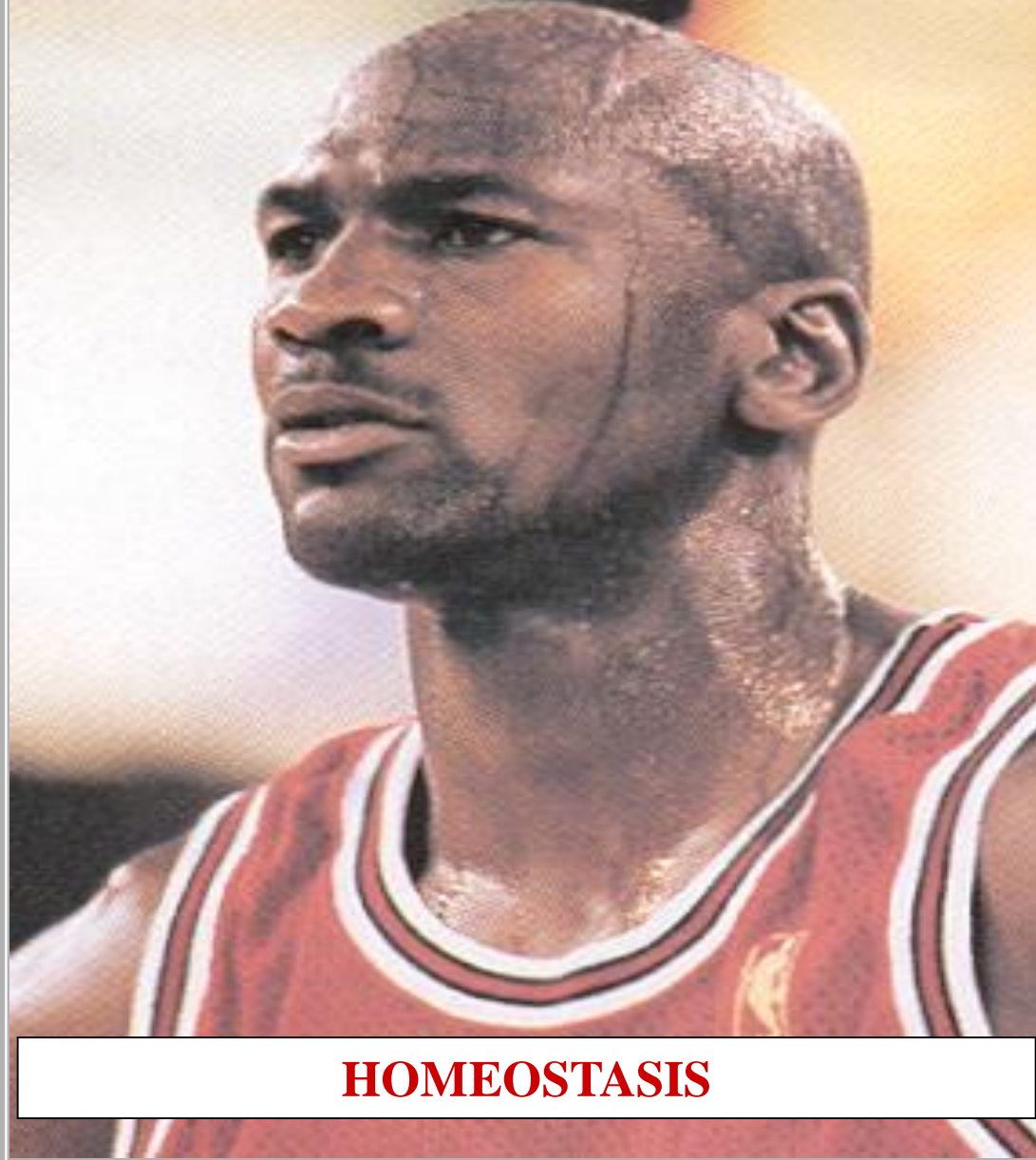
METABOLISM INCREASES

HUMAN METABOLISM



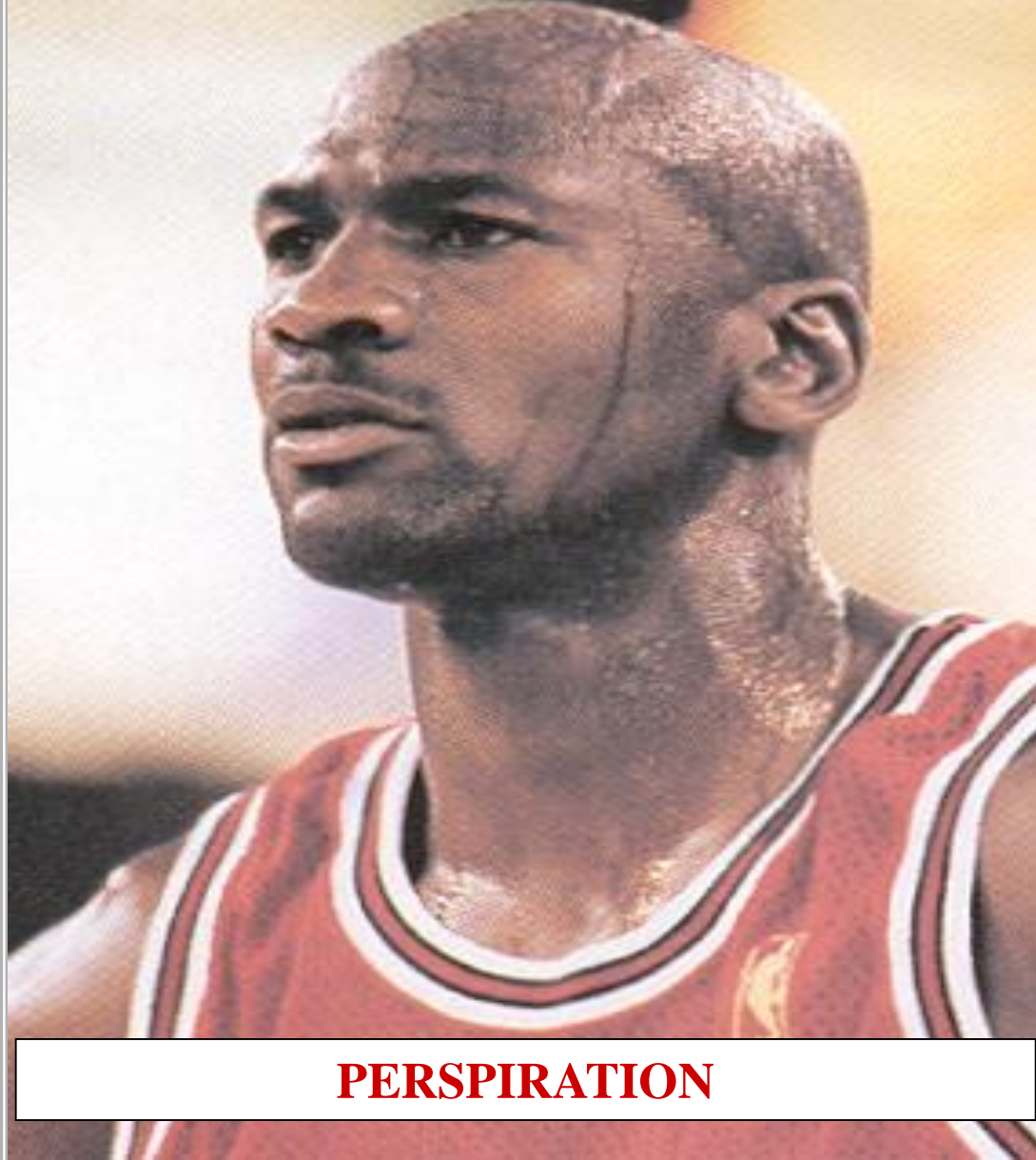
BODY TEMP INCREASES

HUMAN METABOLISM



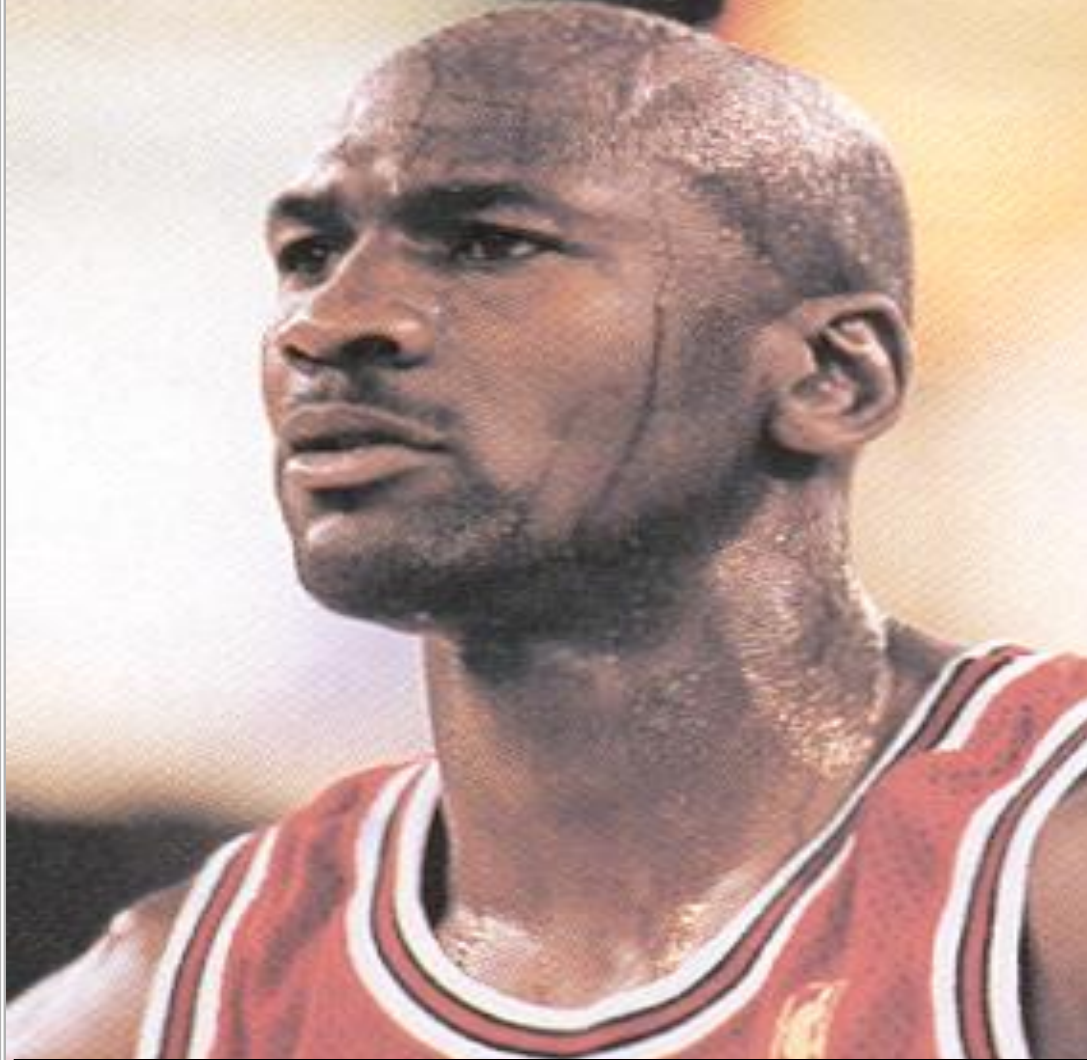
HOMEOSTASIS

HUMAN METABOLISM



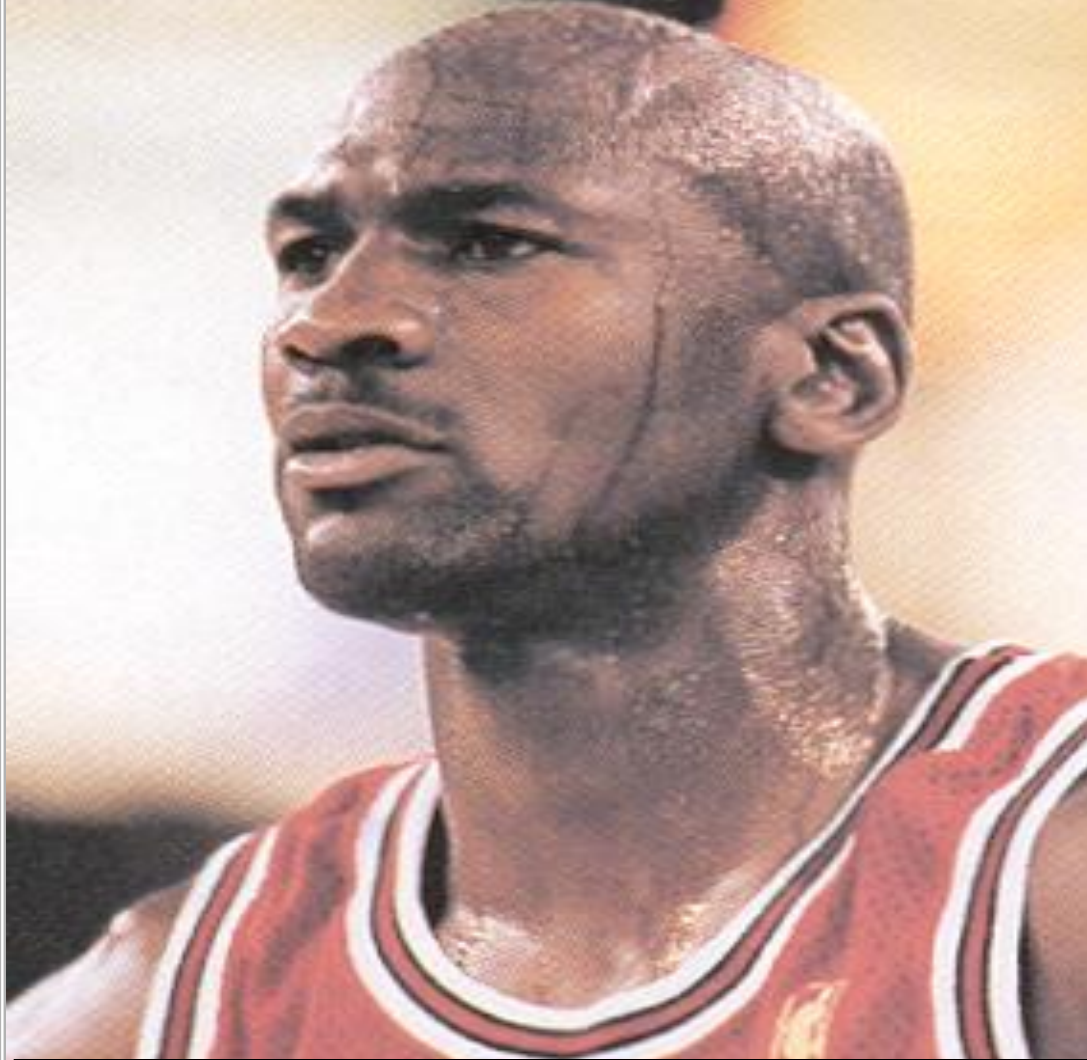
PERSPIRATION

HUMAN METABOLISM



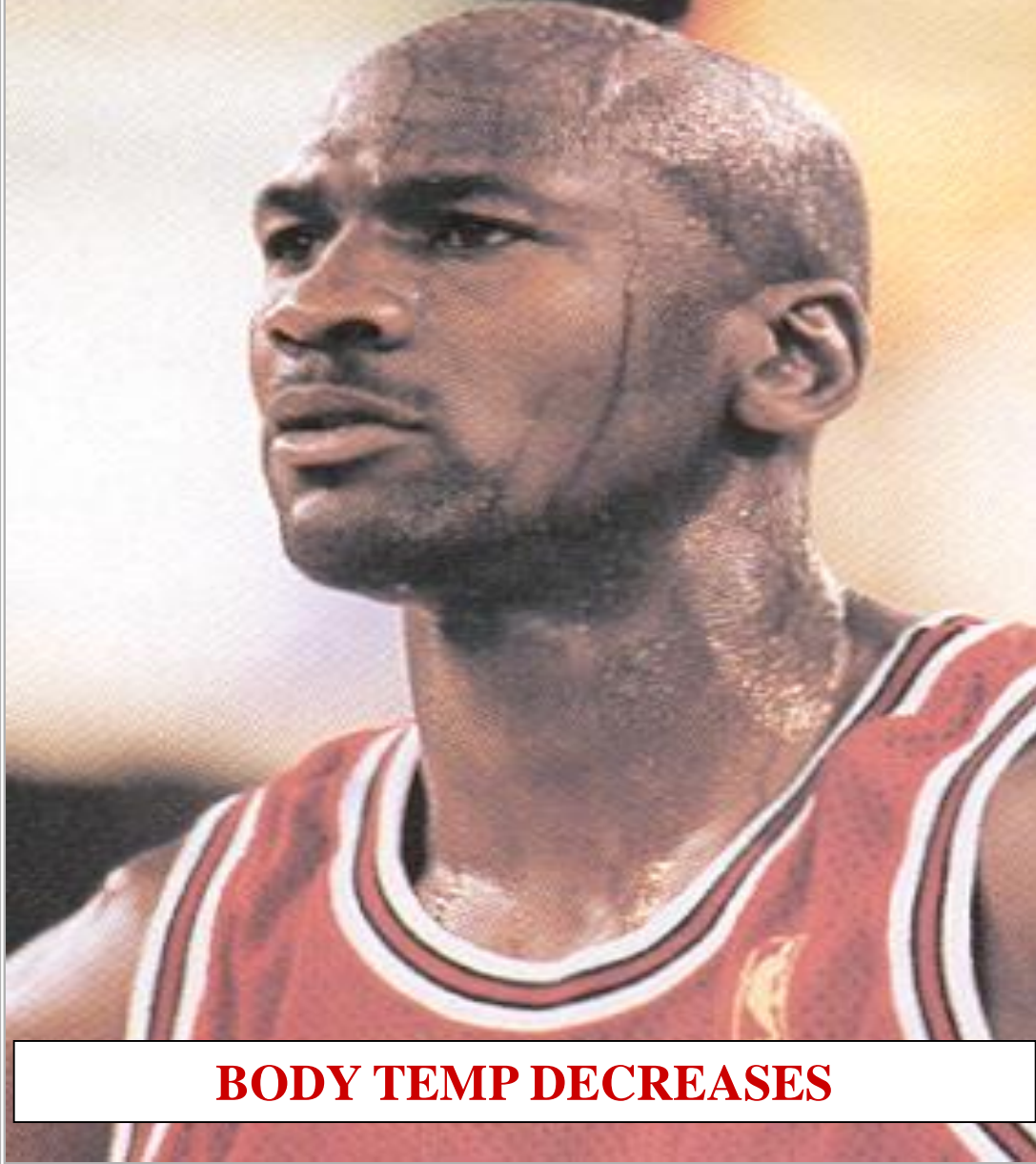
PERSPIRATION
EFFICIENT COOLING SYSTEM

HUMAN METABOLISM



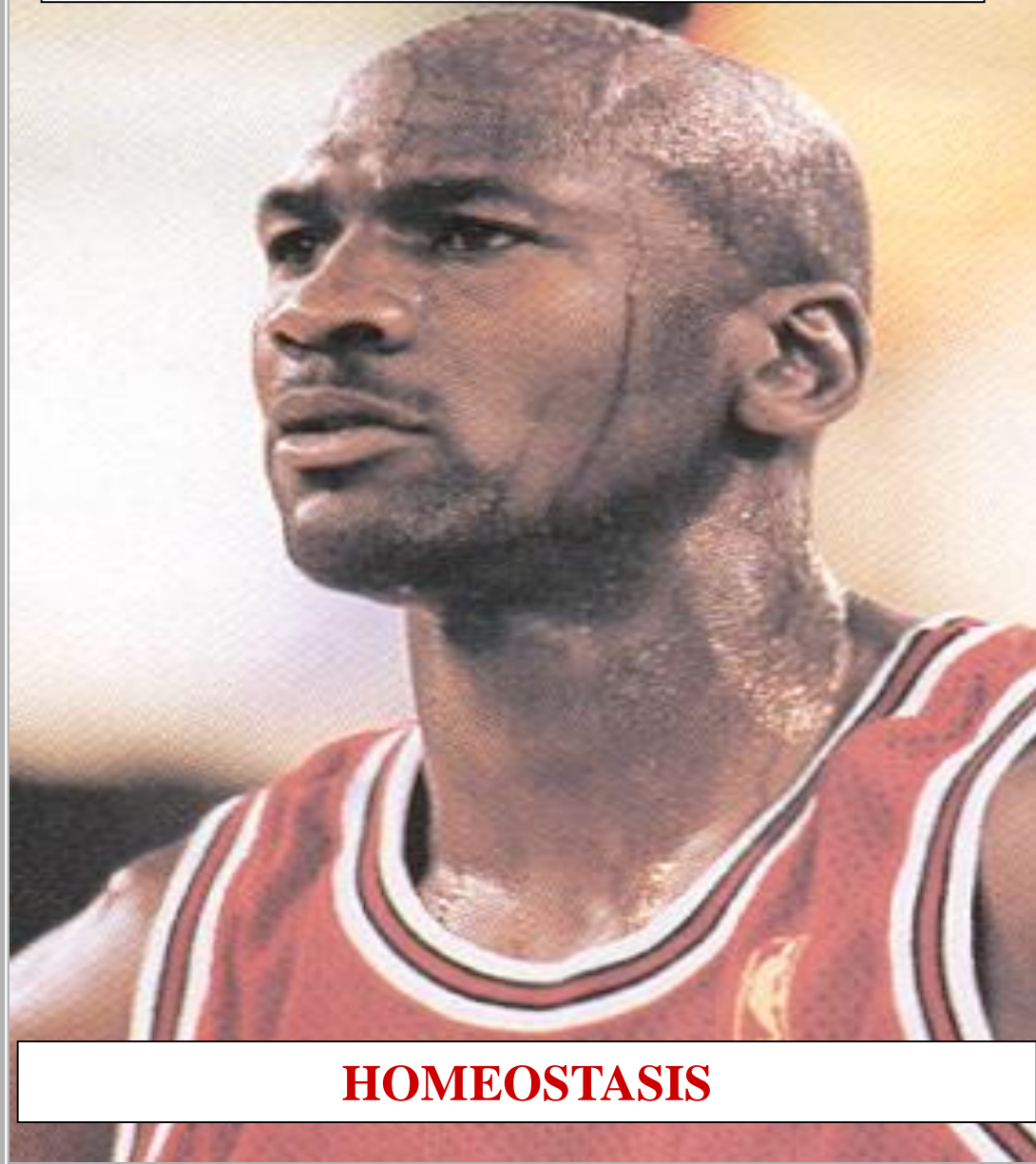
PERSPIRATION
H₂O RESISTS EVAPORATION

HUMAN METABOLISM



BODY TEMP DECREASES

HUMAN METABOLISM



HOMEOSTASIS

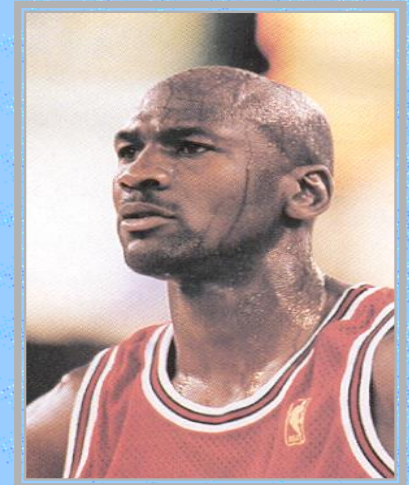
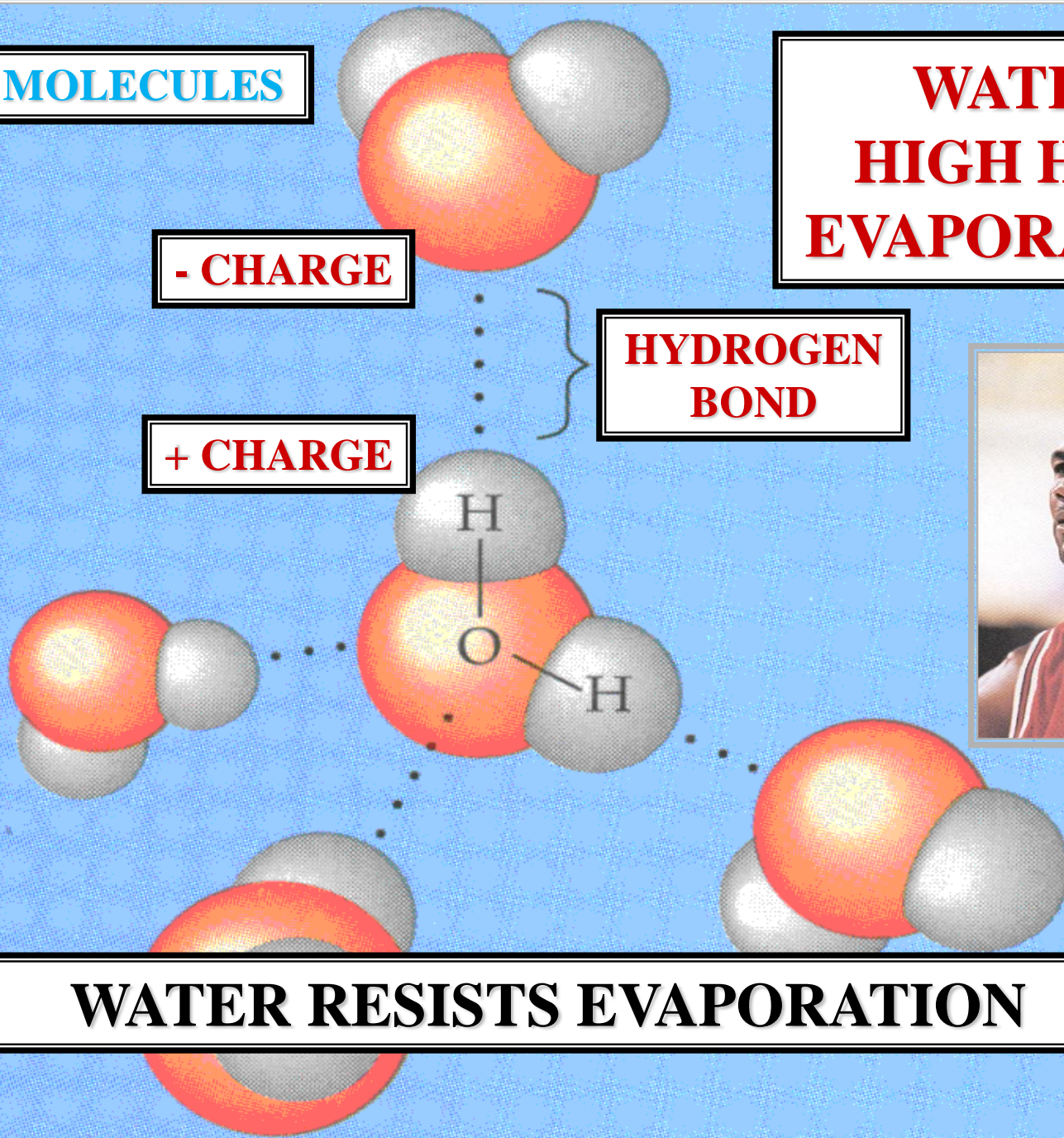
WATER MOLECULES

**WATER
HIGH HEAT
EVAPORATION**

- CHARGE

+ CHARGE

**HYDROGEN
BOND**



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H

WATER RESISTS EVAPORATION

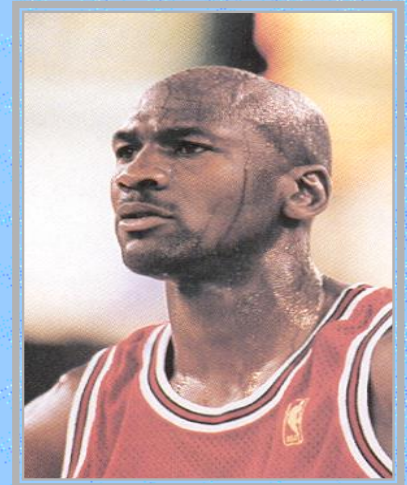
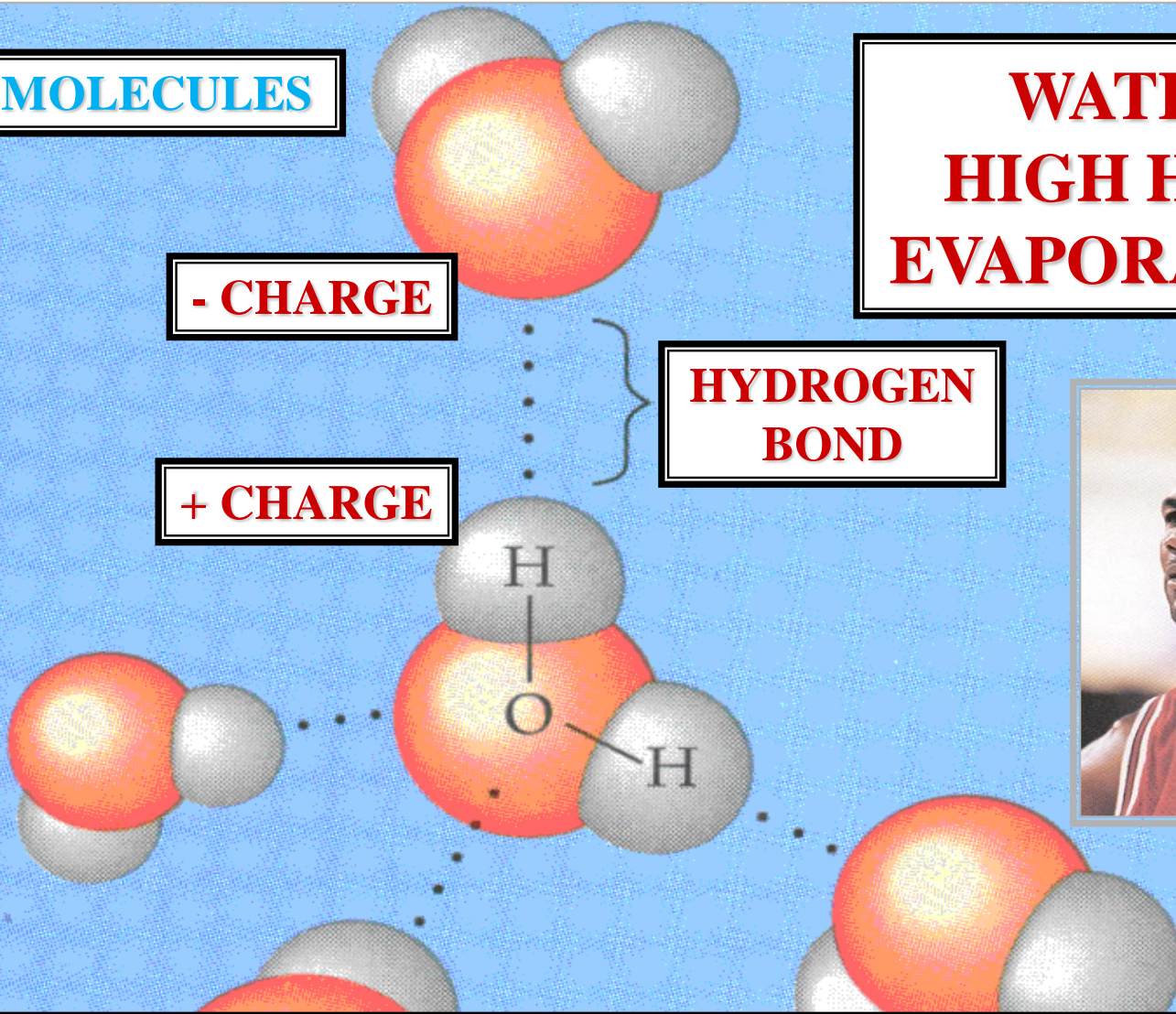
WATER MOLECULES

**WATER
HIGH HEAT
EVAPORATION**

- CHARGE

+ CHARGE

**HYDROGEN
BOND**



**WATER RESISTS EVAPORATION
DUE TO HYDROGEN BONDS**

WATER BIO-IMPORTANT PROPERTIES

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WATER'S HIGH

HEAT EVAPORATION

REGULATES

HUMAN METABOLIC

TEMPERATURE

WATER BIO-IMPORTANT PROPERTIES



BIO-IMPORTANT WATER PROPERTIES SUMMARY

QUESTION

**WHAT ARE THE
BIO-IMPORTANT
PROPERTIES OF
WATER?**

QUESTION

BIO-IMPORTANT WATER PROPERTIES

COHESION

BIO-IMPORTANT WATER PROPERTIES

BIO-IMPORTANT WATER PROPERTIES

COHESION

ADHESION

BIO-IMPORTANT WATER PROPERTIES

BIO-IMPORTANT WATER PROPERTIES

COHESION

ADHESION

HIGH SPECIFIC HEAT

BIO-IMPORTANT WATER PROPERTIES



BIO-IMPORTANT WATER PROPERTIES

COHESION

ADHESION

HIGH SPECIFIC HEAT

HIGH HEAT EVAPORATION

BIO-IMPORTANT WATER PROPERTIES

QUESTION

**WHAT IMPARTS
BIO-IMPORTANT
PROPERTIES TO
WATER?**

QUESTION

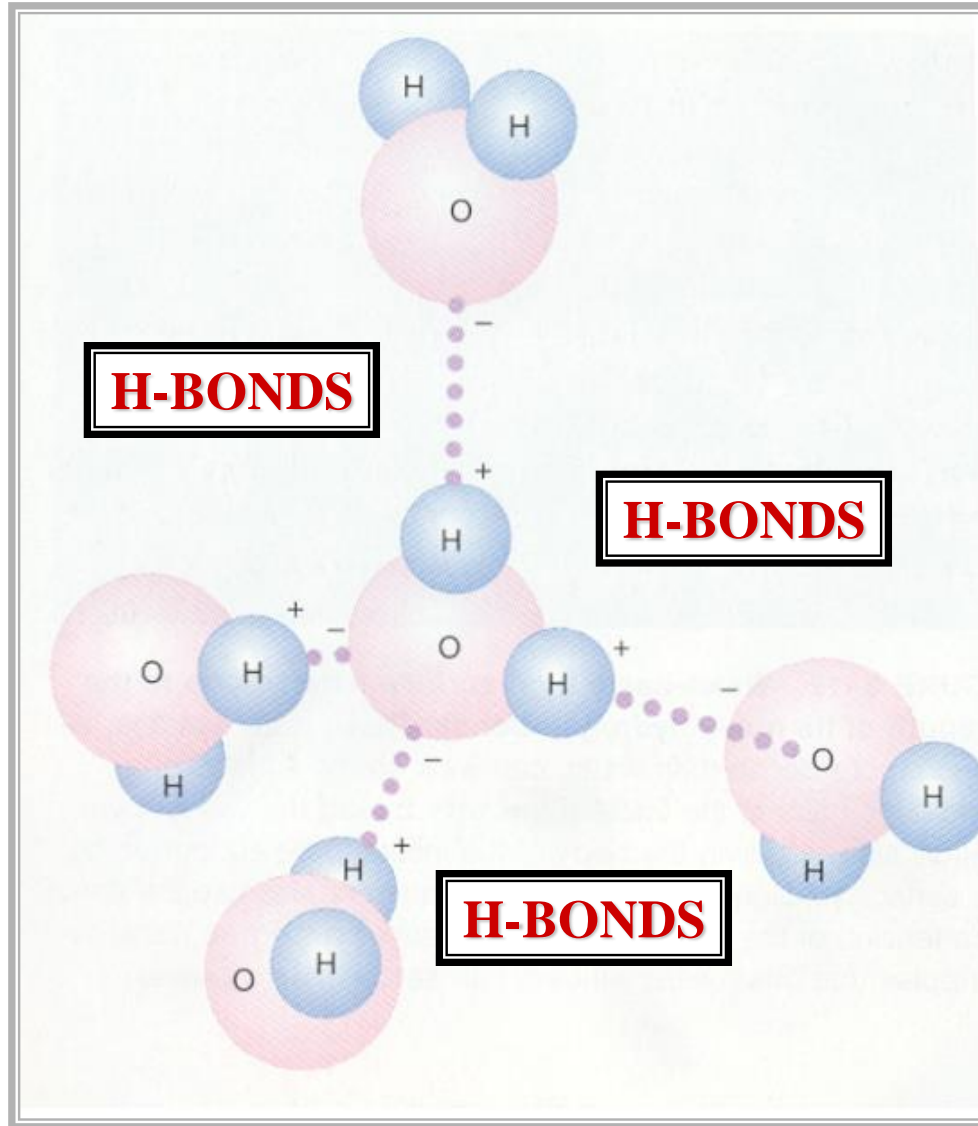


ANSWER

HYDROGEN BONDS

ANSWER

ANSWER: HYDROGEN BONDS



ANSWER: HYDROGEN BONDS

WATER BIO-IMPORTANT PROPERTIES

^

H-BONDS IMPART

BIO-IMPORTANT

PROPERTIES

TO

WATER

WATER BIO-IMPORTANT PROPERTIES



ACIDS & BASES

SOLUTION TERMS

SOLUTION

SOLUTION TERMS

S

SOLUTION

SOLVENT-SOLUTE

MIXTURE

SOLUTION TERMS

SOLUTION

SOLVENT

SOLUTION TERMS

SOLVENT

LIQUID

SOLUTION

COMPONENT

SOLUTION TERMS

SOLVENT

SOLUTE

SOLUTION TERMS



SOLUTE

DISSOLVED

SOLUTION

COMPONENT

SOLUTION TERMS

SOLUTE

QUESTION

WHAT DO SCIENTISTS

CALL A SOLUTION

WHERE WATER SERVES

AS THE SOLVENT?

QUESTION



ANSWER

**AQUEOUS
SOLUTION**

ANSWER

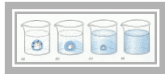
AQUEOUS SOLUTION

AQUEOUS SOLUTION

AQUEOUS SOLUTION

**WATER
SERVES AS THE
SOLVENT**

AQUEOUS SOLUTION



SUGAR SOLUTION EXAMPLE

SOLUTION TERMINOLOGY

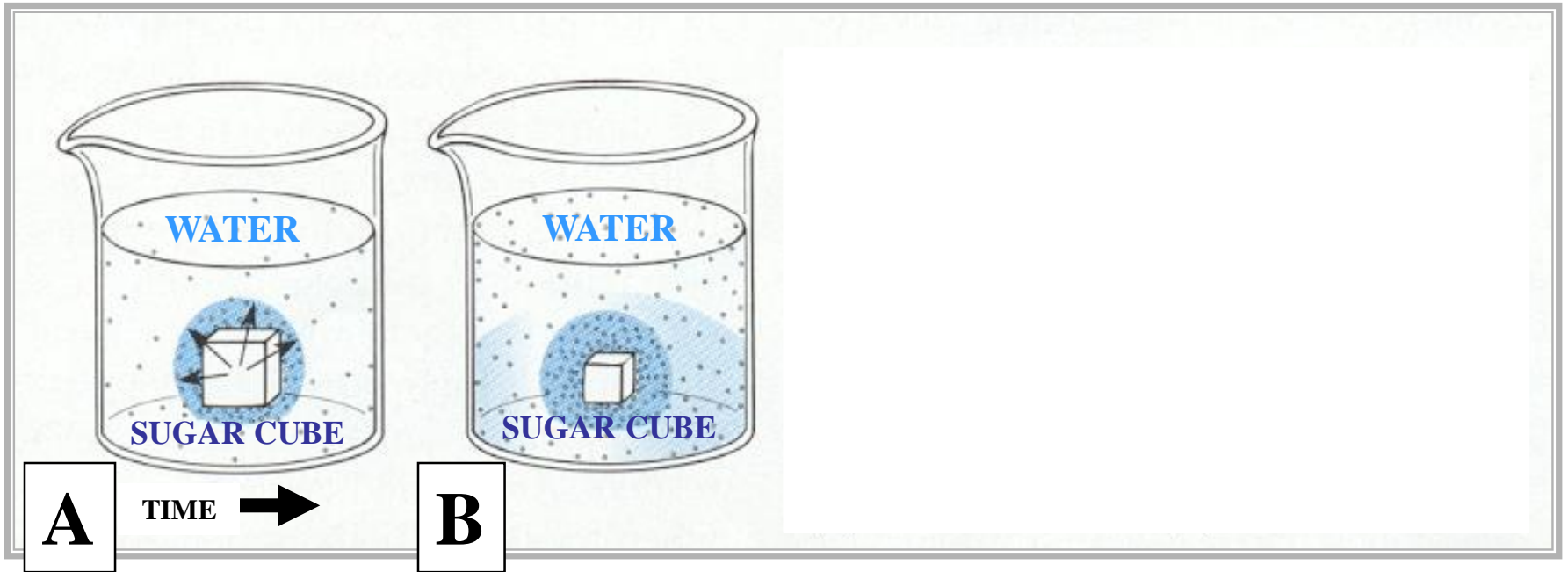


WATER = SOLVENT

SUGAR = SOLUTE

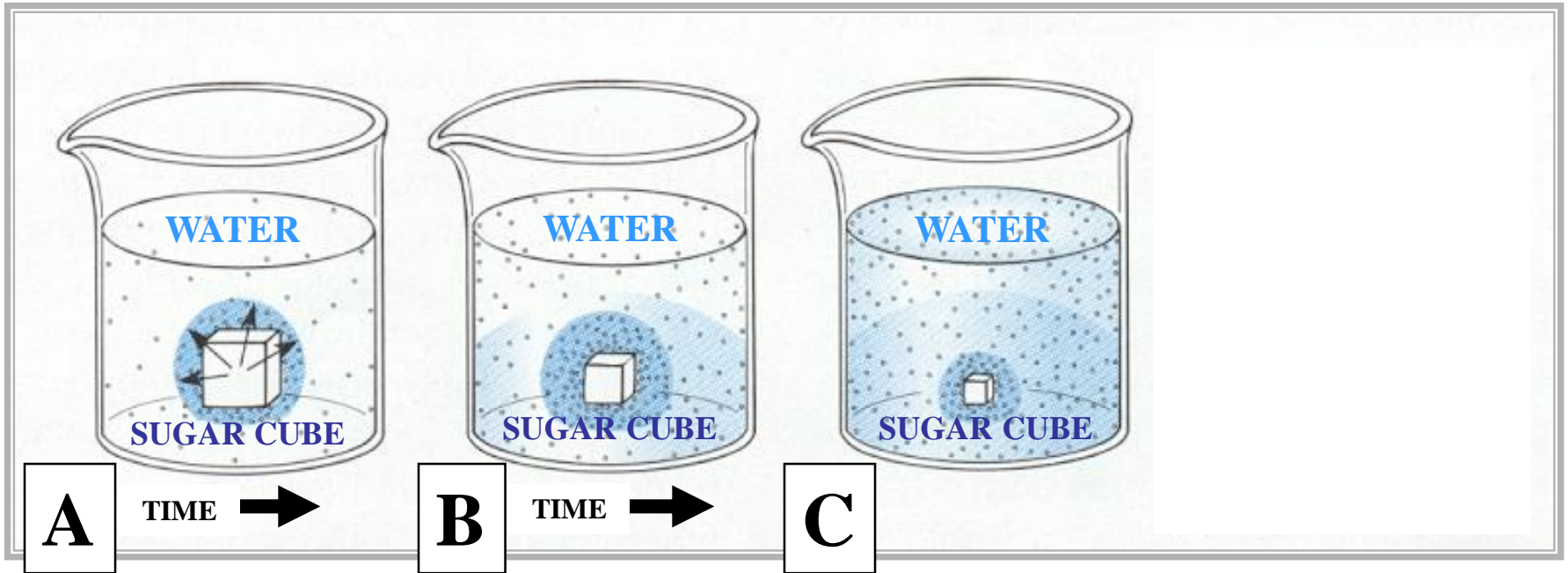
**SUGAR
SOLUTION**

SOLUTION TERMINOLOGY



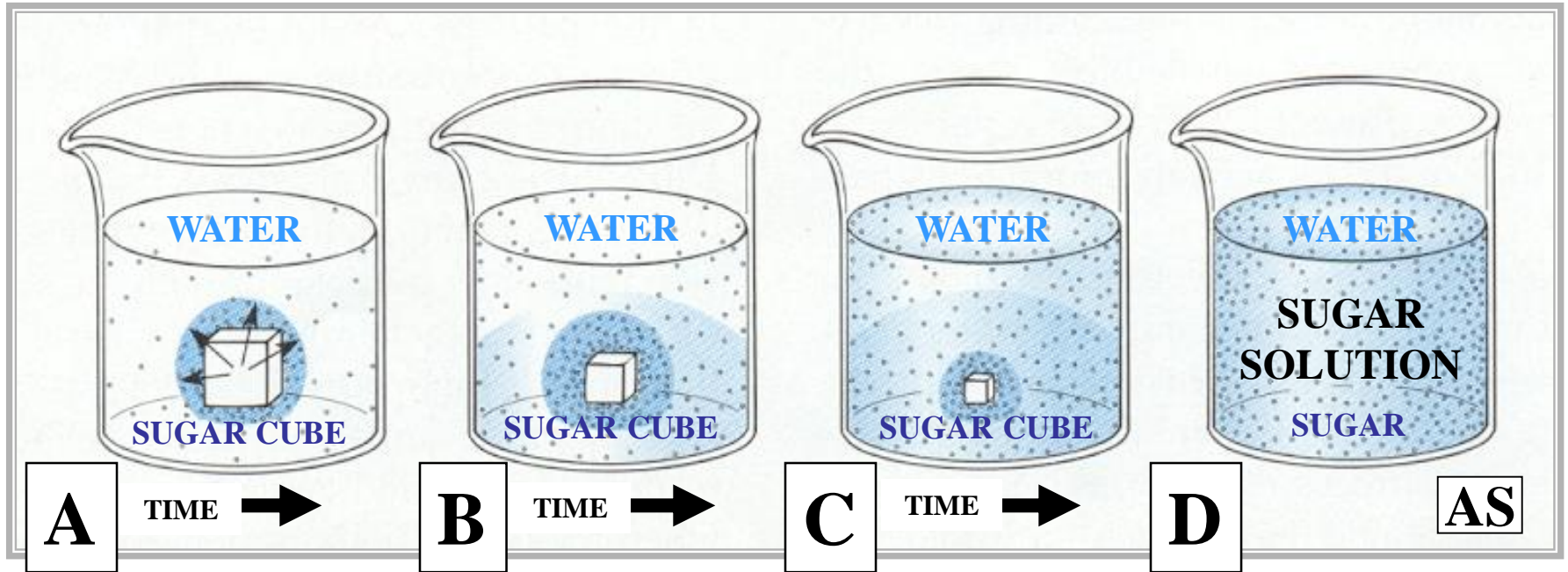
WATER = SOLVENT
SUGAR = SOLUTE } **SUGAR SOLUTION**

SOLUTION TERMINOLOGY



WATER = SOLVENT
SUGAR = SOLUTE } **SUGAR SOLUTION**

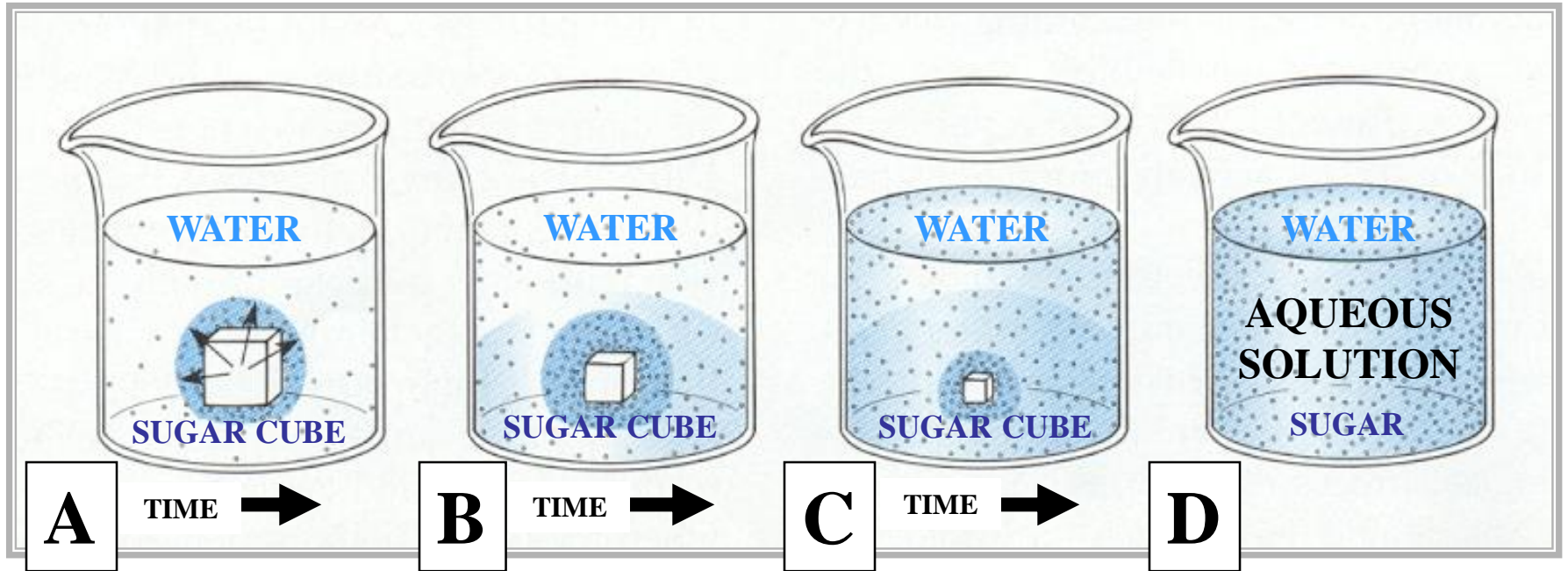
SOLUTION TERMINOLOGY



WATER = SOLVENT
SUGAR = SOLUTE } **SUGAR SOLUTION**



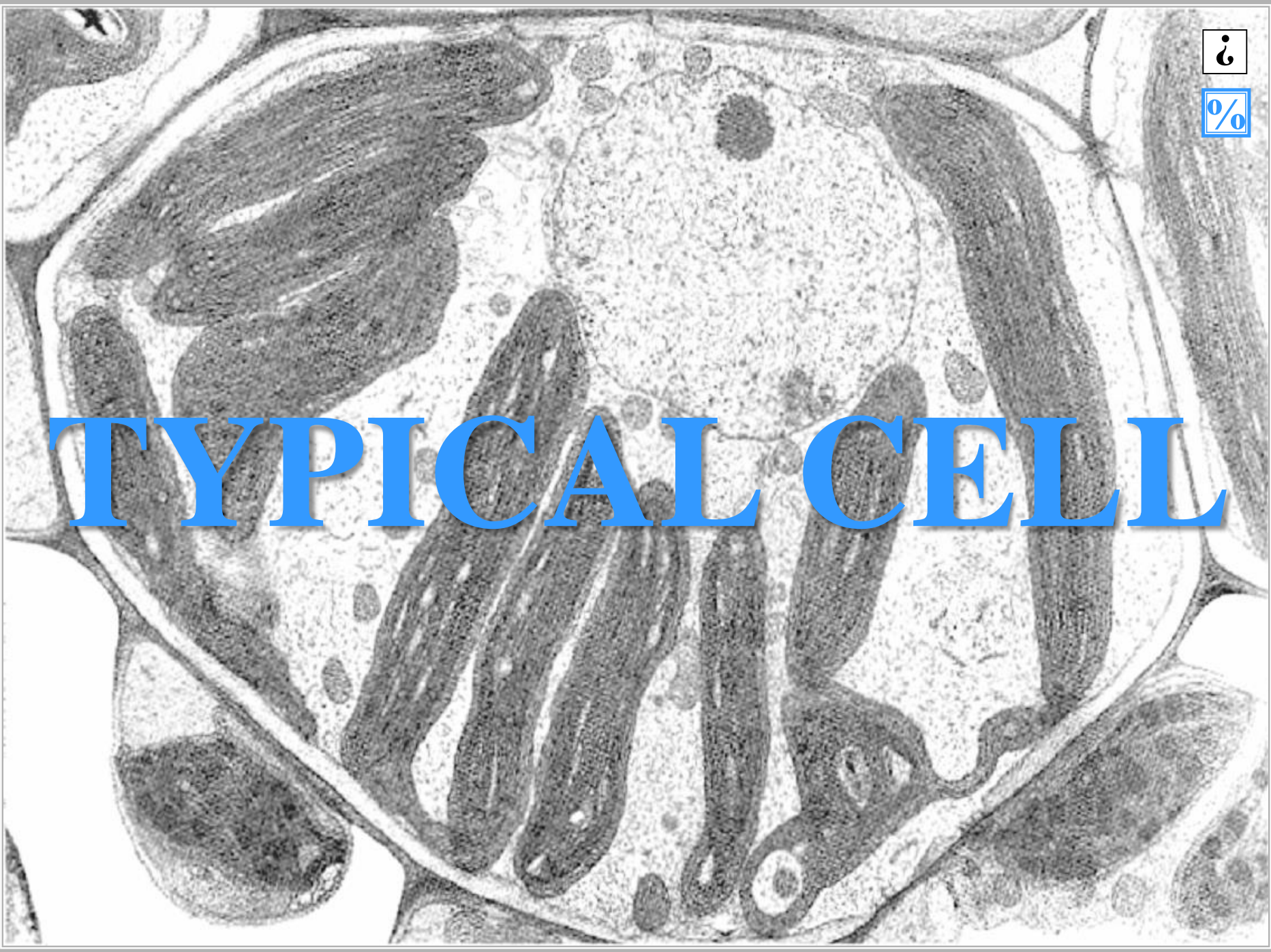
SOLUTION TERMINOLOGY



WATER = SOLVENT
SUGAR = SOLUTE } **AQUEOUS SOLUTION**



TYPICAL CELL



TYPICAL CELL

70% - 90%

WATER

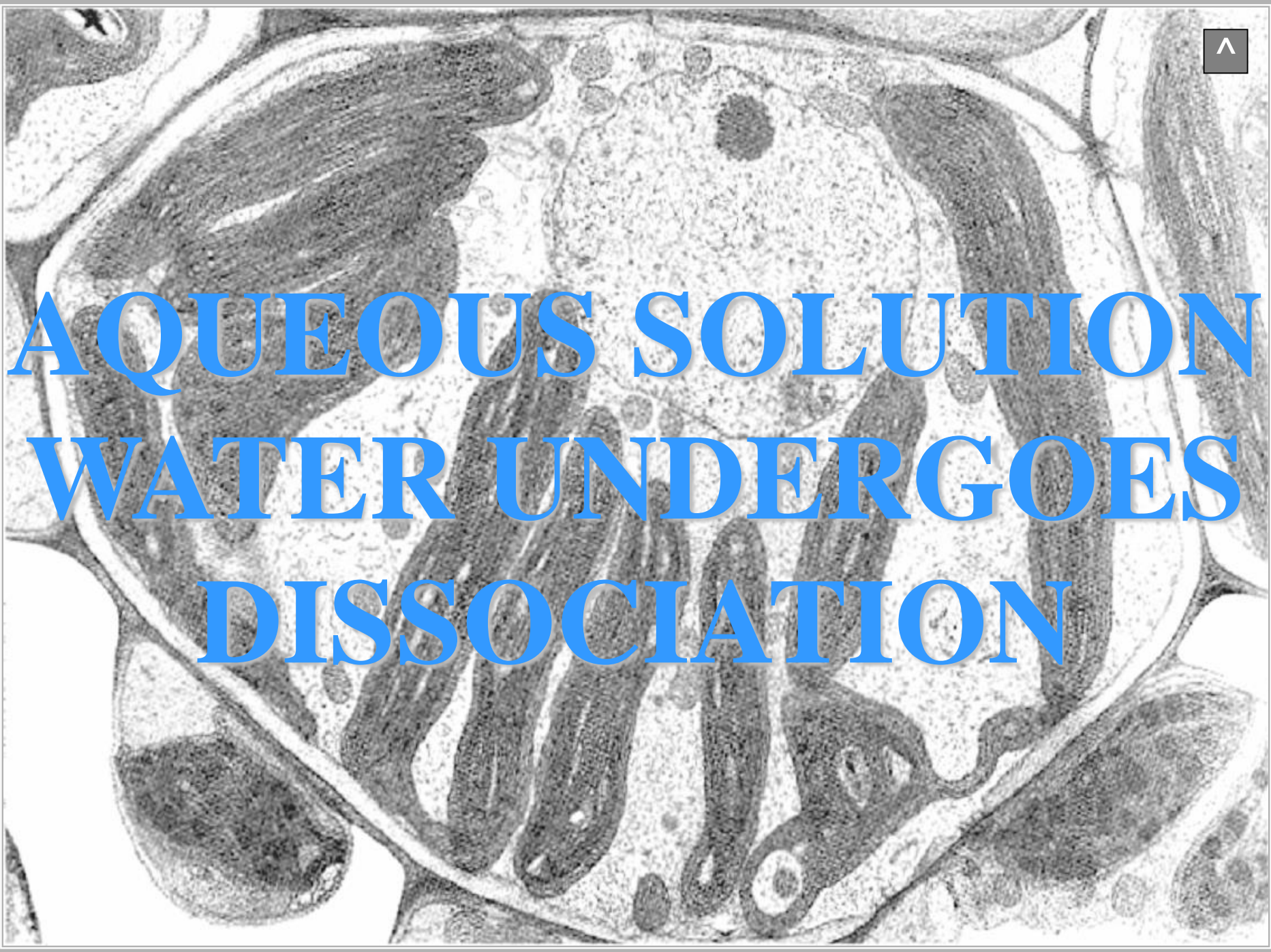
A transmission electron micrograph showing a cross-section of a cell. The cell contains various organelles, including a large nucleus with a prominent nucleolus, rough endoplasmic reticulum, and mitochondria. The text 'TYPICAL CELL AQUEOUS SOLUTION' is overlaid in large blue letters. In the top right corner, there is a small black square with a white plus sign and a white box with the letters 'WD' in blue.

+

WD

TYPICAL CELL AQUEOUS SOLUTION

**AQUEOUS SOLUTION
WATER UNDERGOES
DISSOCIATION**



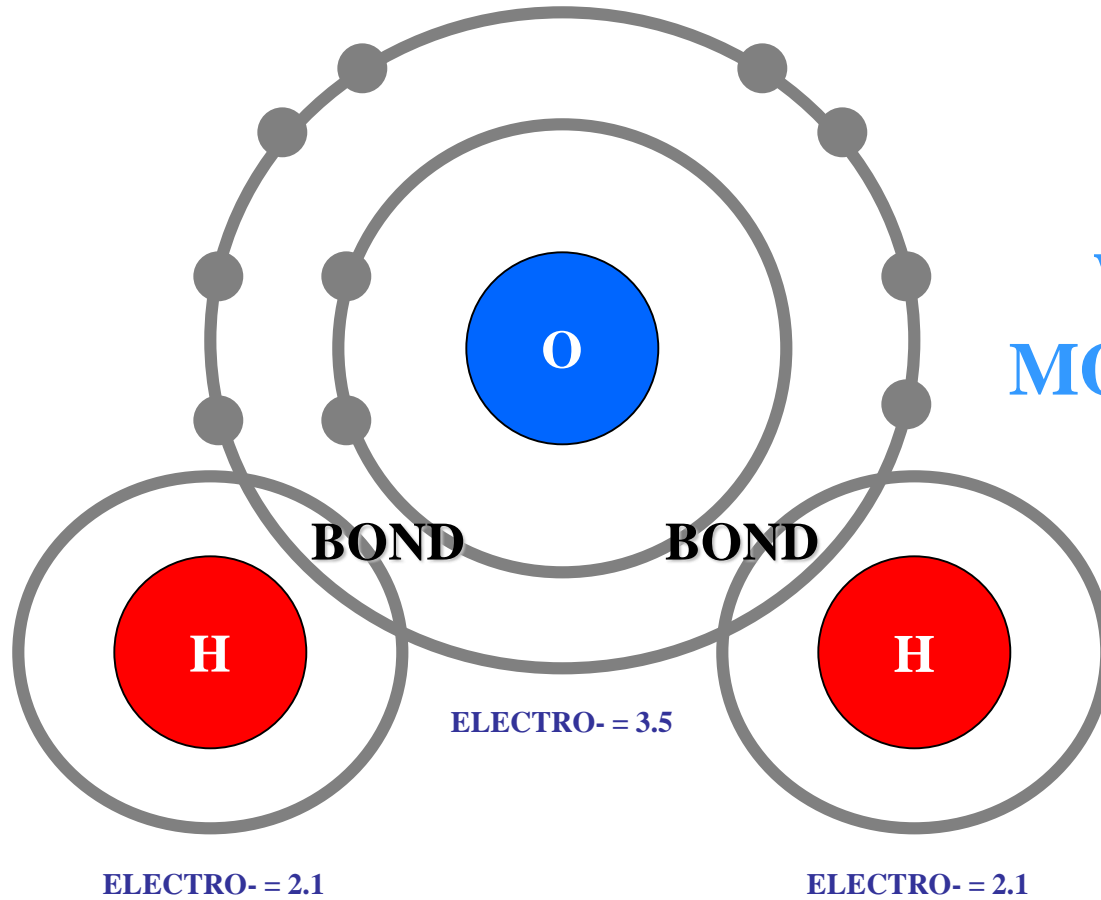
WATER DISSOCIATION

WATER MOLECULE

OXYGEN
HIGHER
ELECTRO-

HYDROGEN
LOWER
ELECTRO-

WATER
MOLECULE



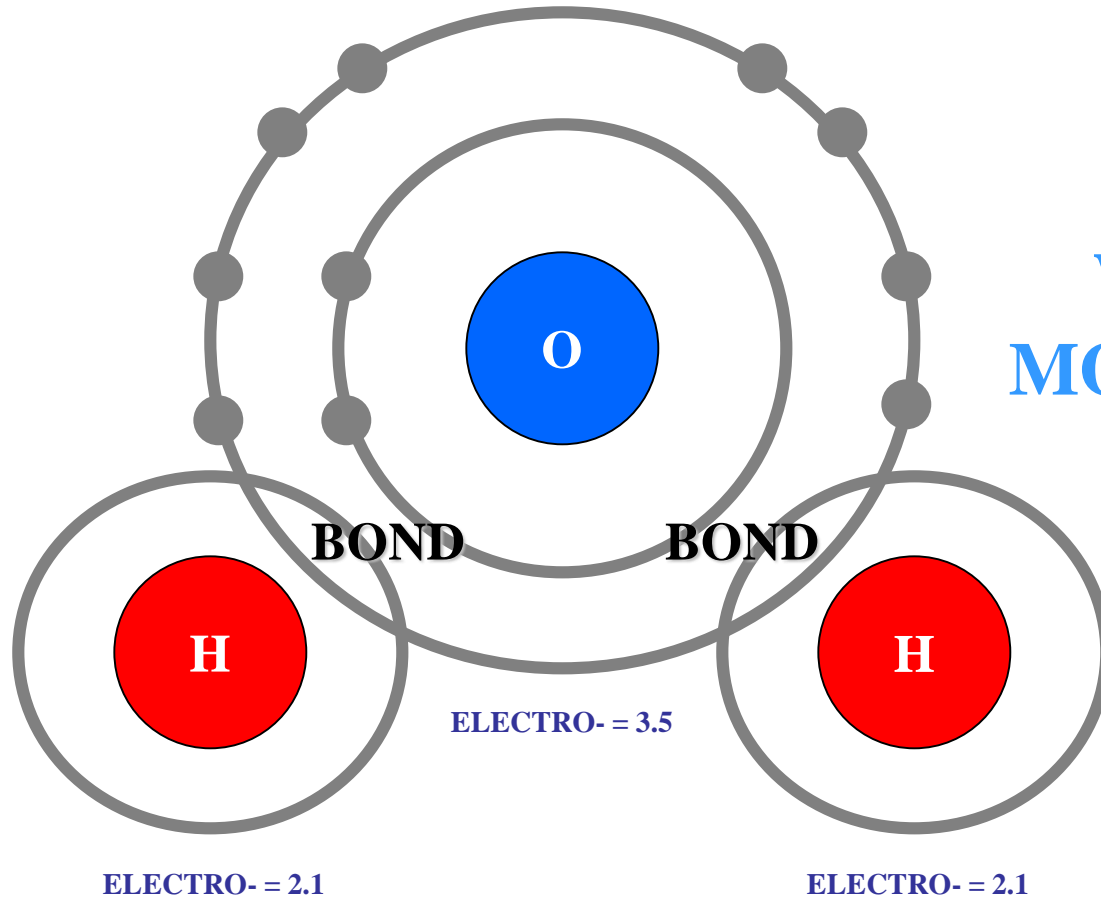
● = E-

COVALENT BOND

OXYGEN
HIGHER
ELECTRO-

HYDROGEN
LOWER
ELECTRO-

WATER
MOLECULE

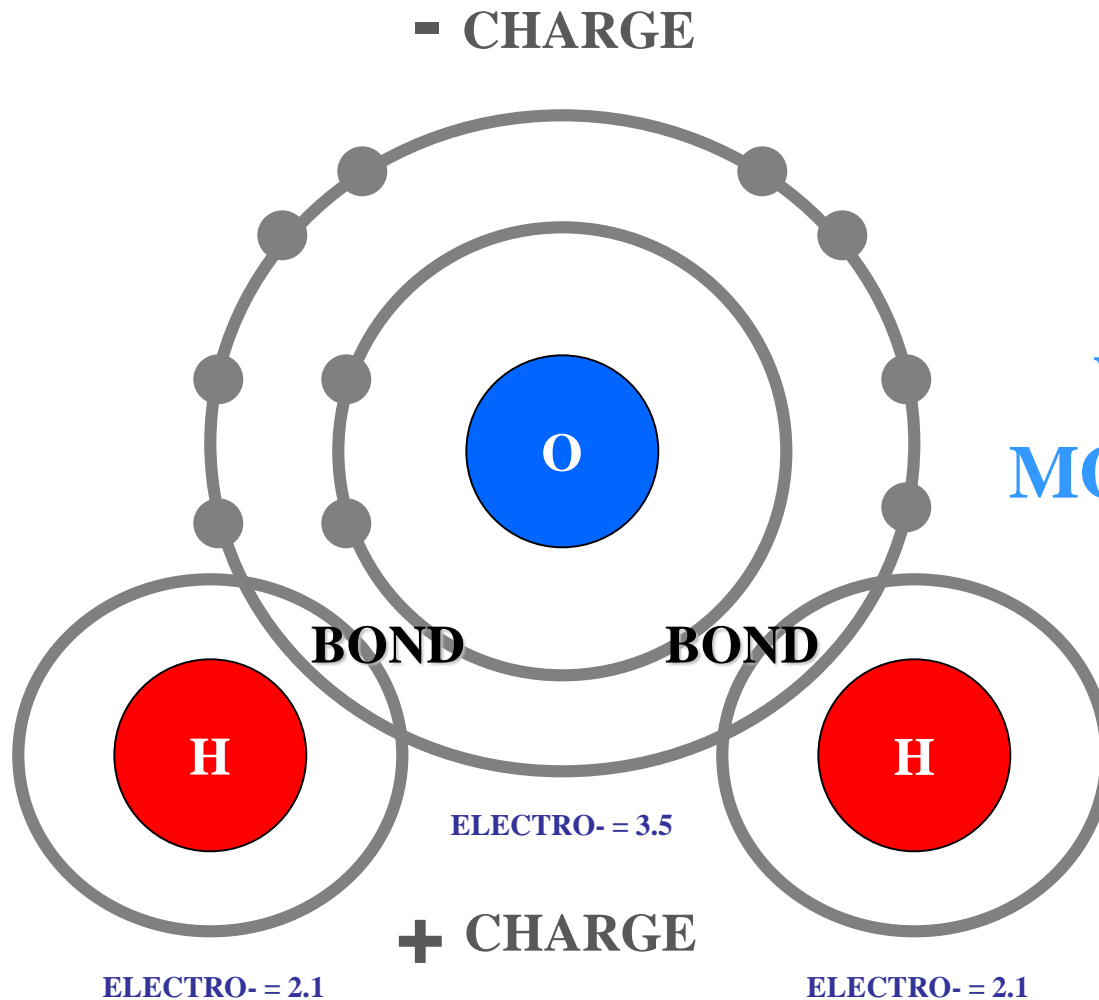


● = E-

POLAR COVALENT BOND

OXYGEN
HIGHER
ELECTRO-

HYDROGEN
LOWER
ELECTRO-



● = E-

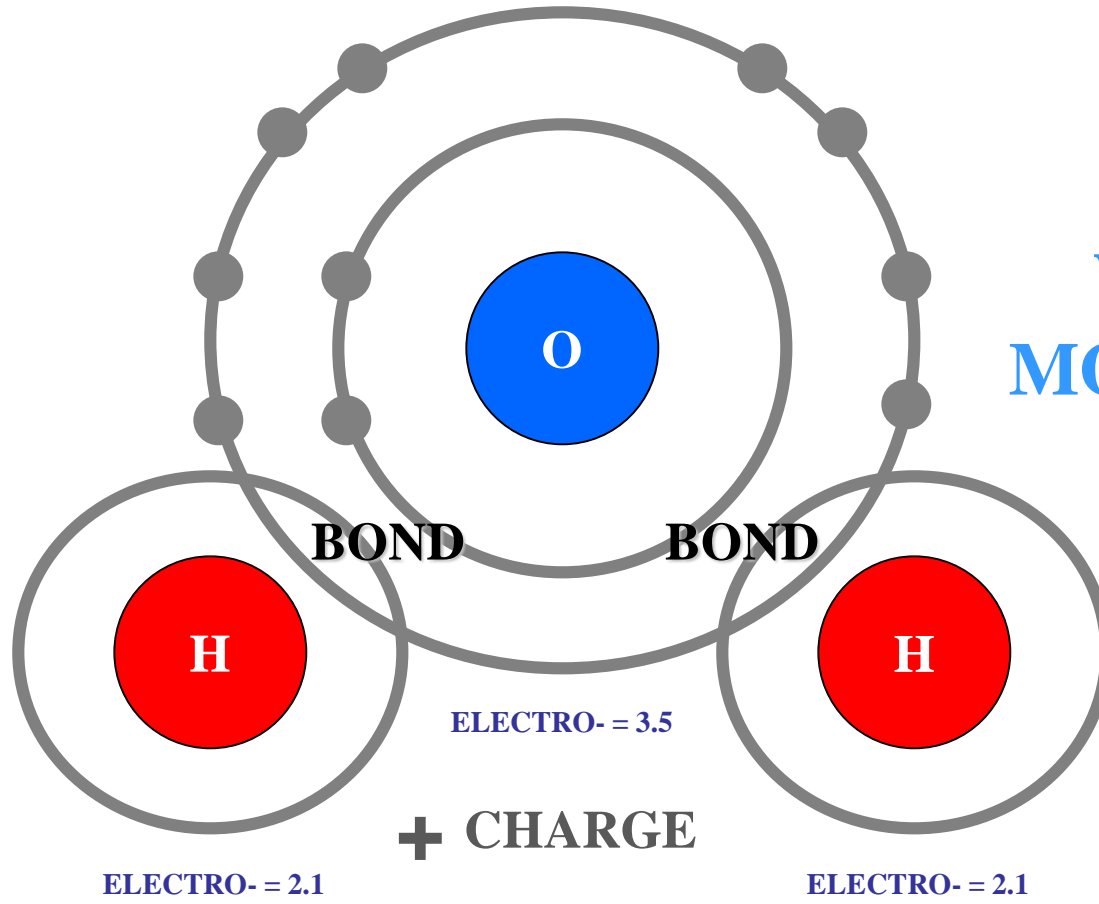
POLAR COVALENT BOND

- CHARGE

OXYGEN
HIGHER
ELECTRO-

HYDROGEN
LOWER
ELECTRO-

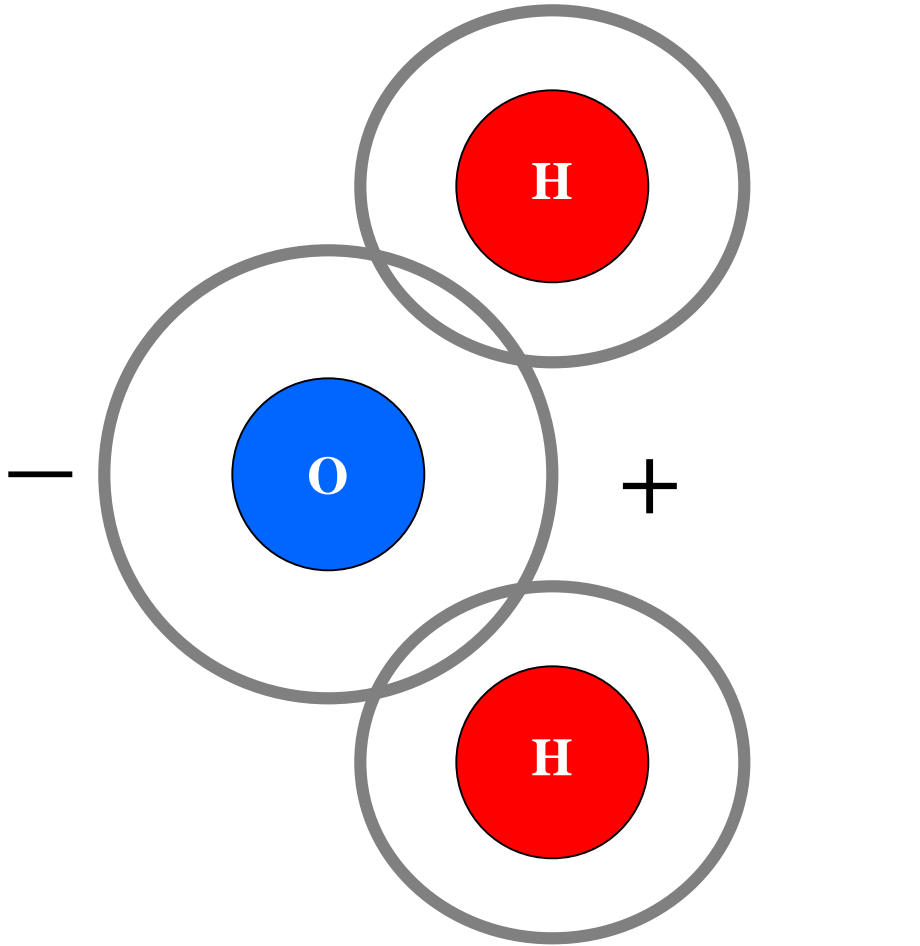
**WATER
MOLECULE**



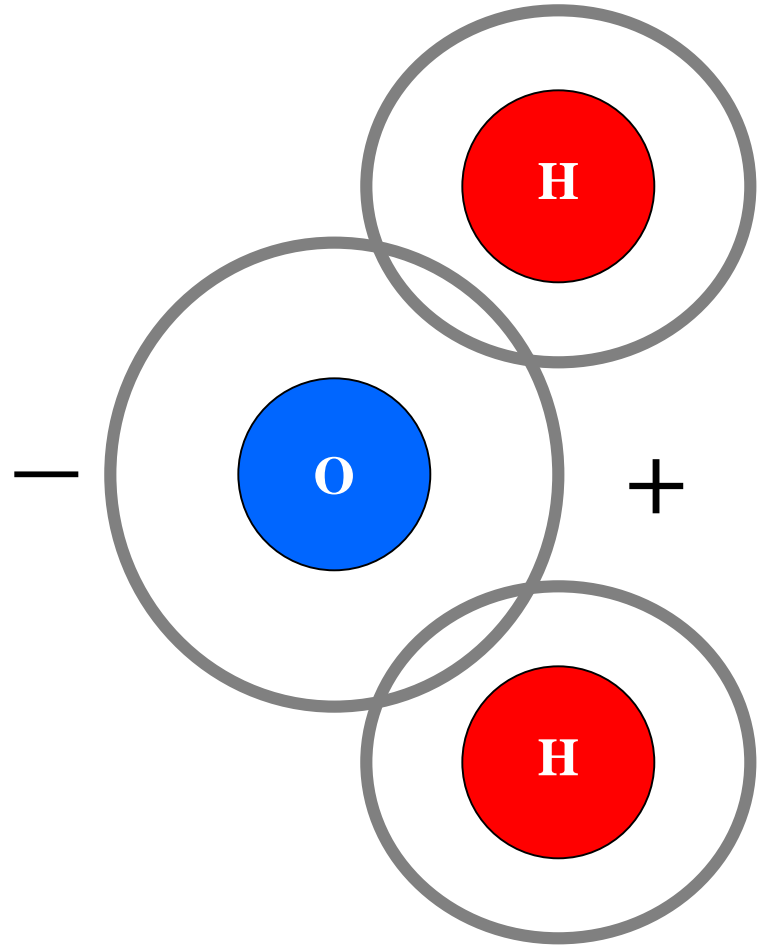
● = E-

HIGHLY POLAR

WATER MOLECULES



WATER

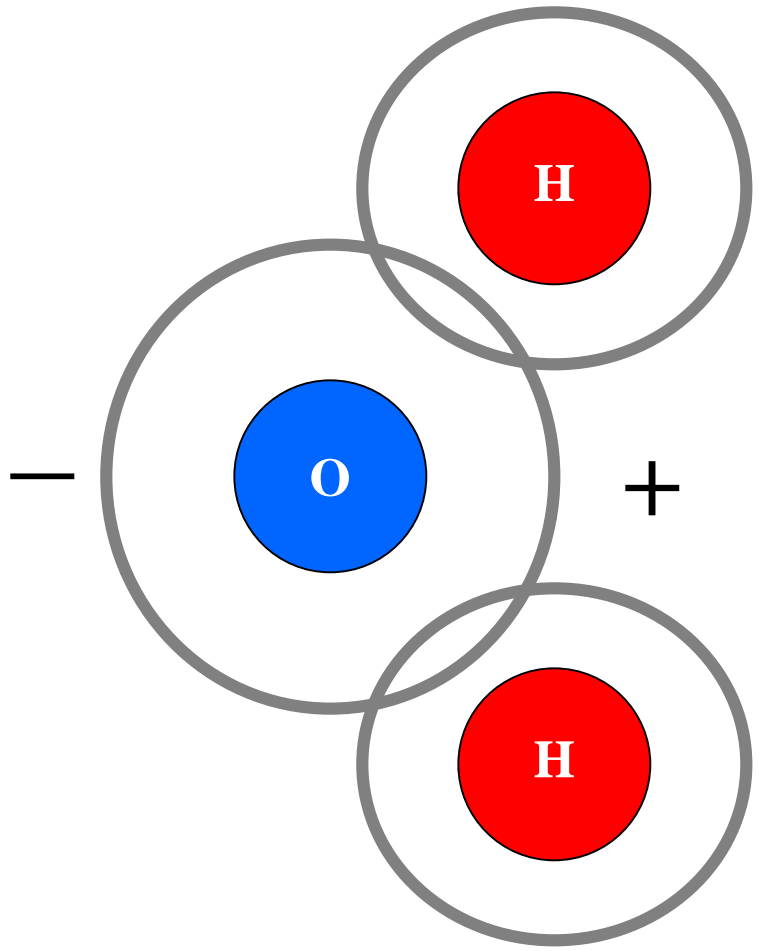
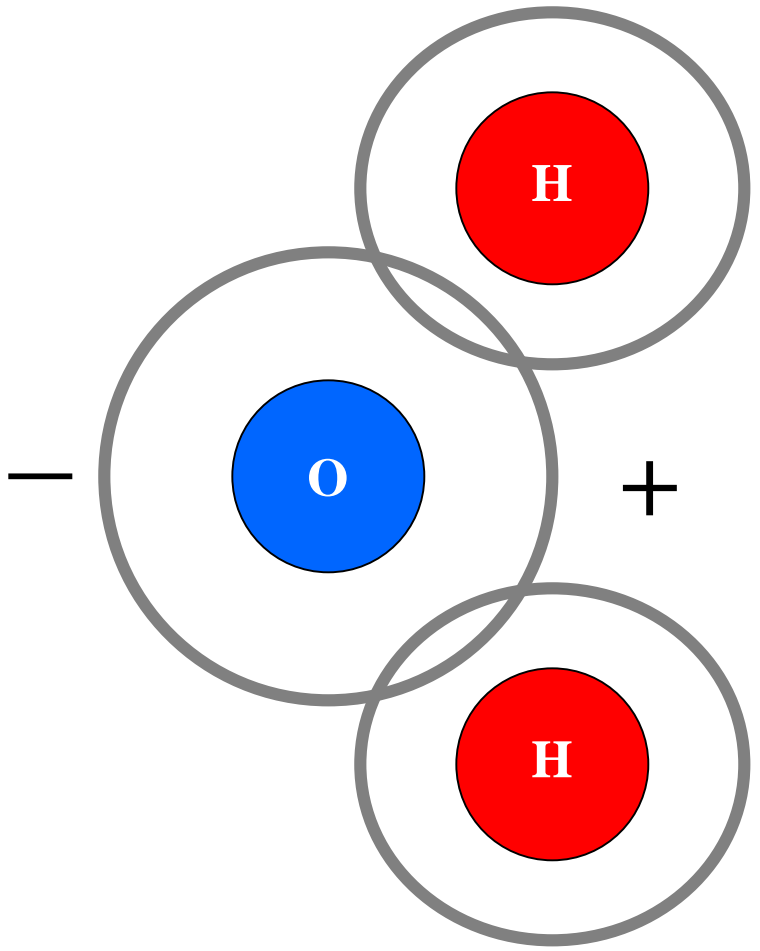


WATER

WATER MOLECULES

H

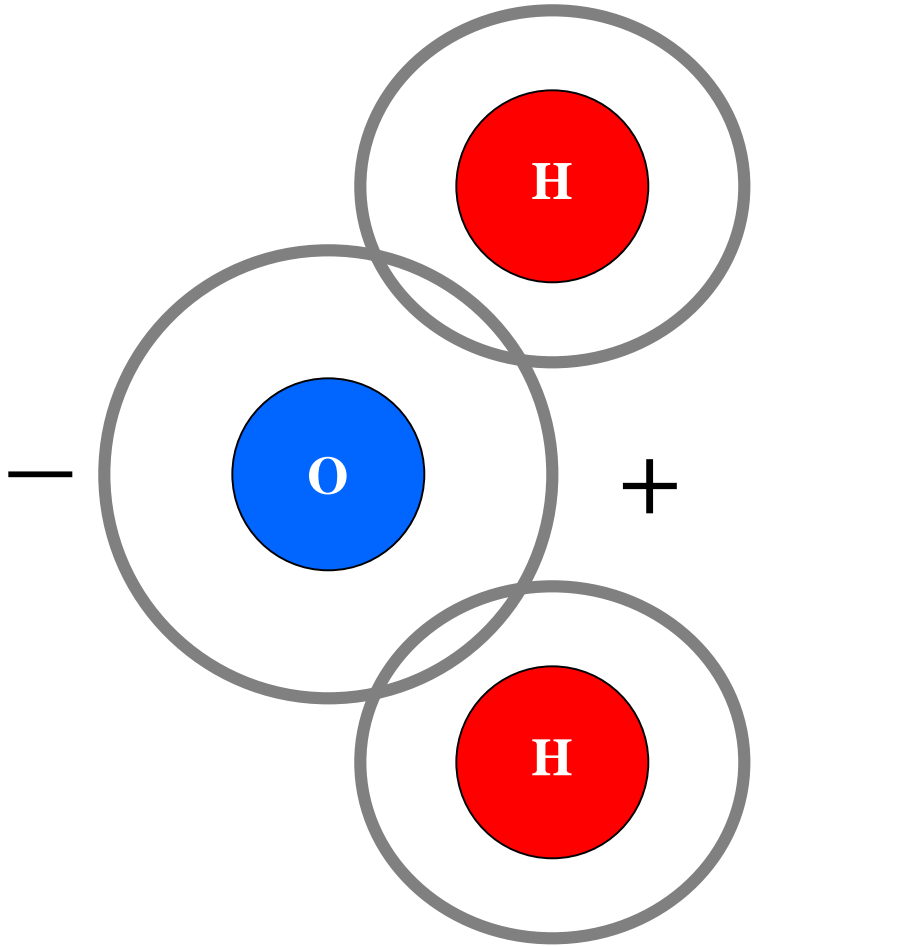
+



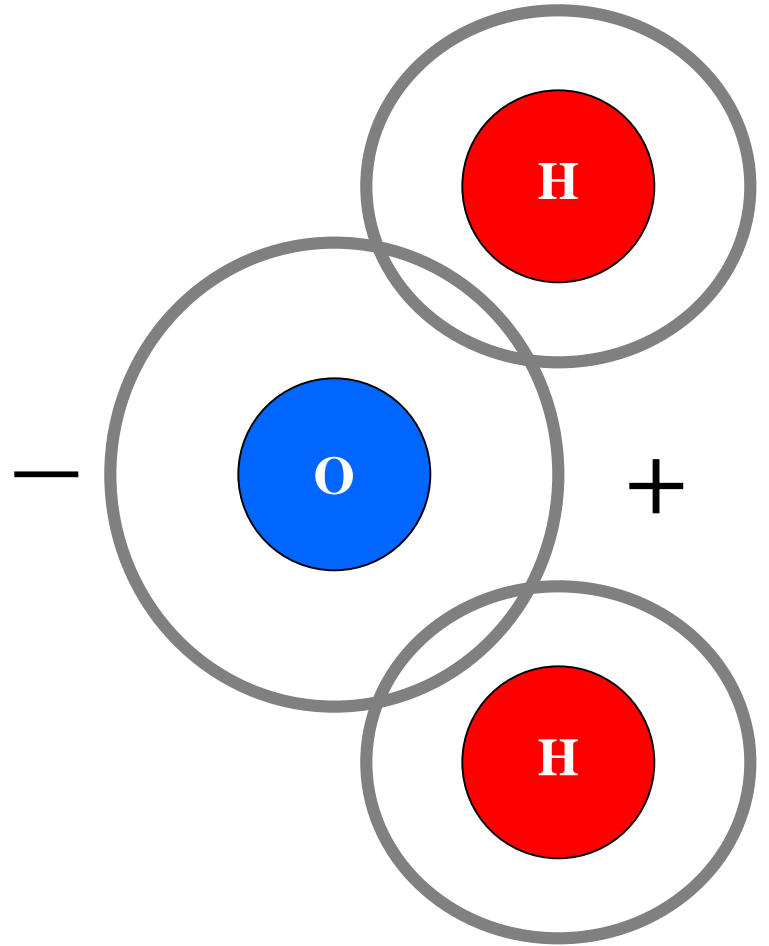
HIGHLY POLAR

HIGHLY POLAR

WATER MOLECULES

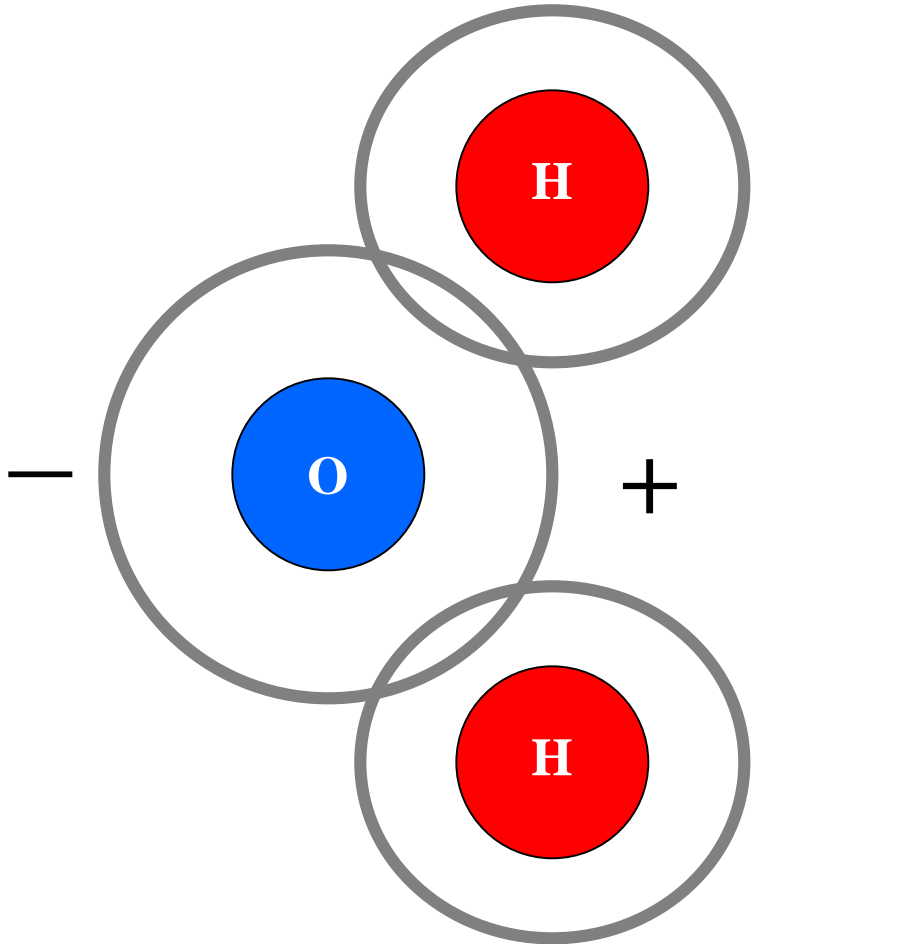


HYDROGEN POLE +

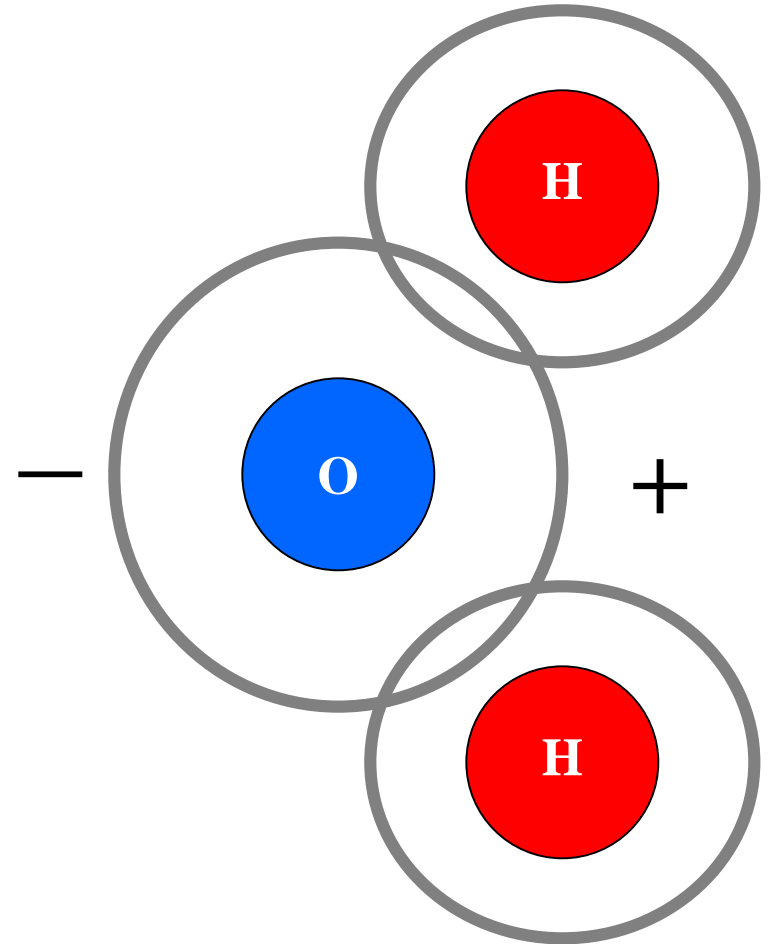


WATER

WATER MOLECULES

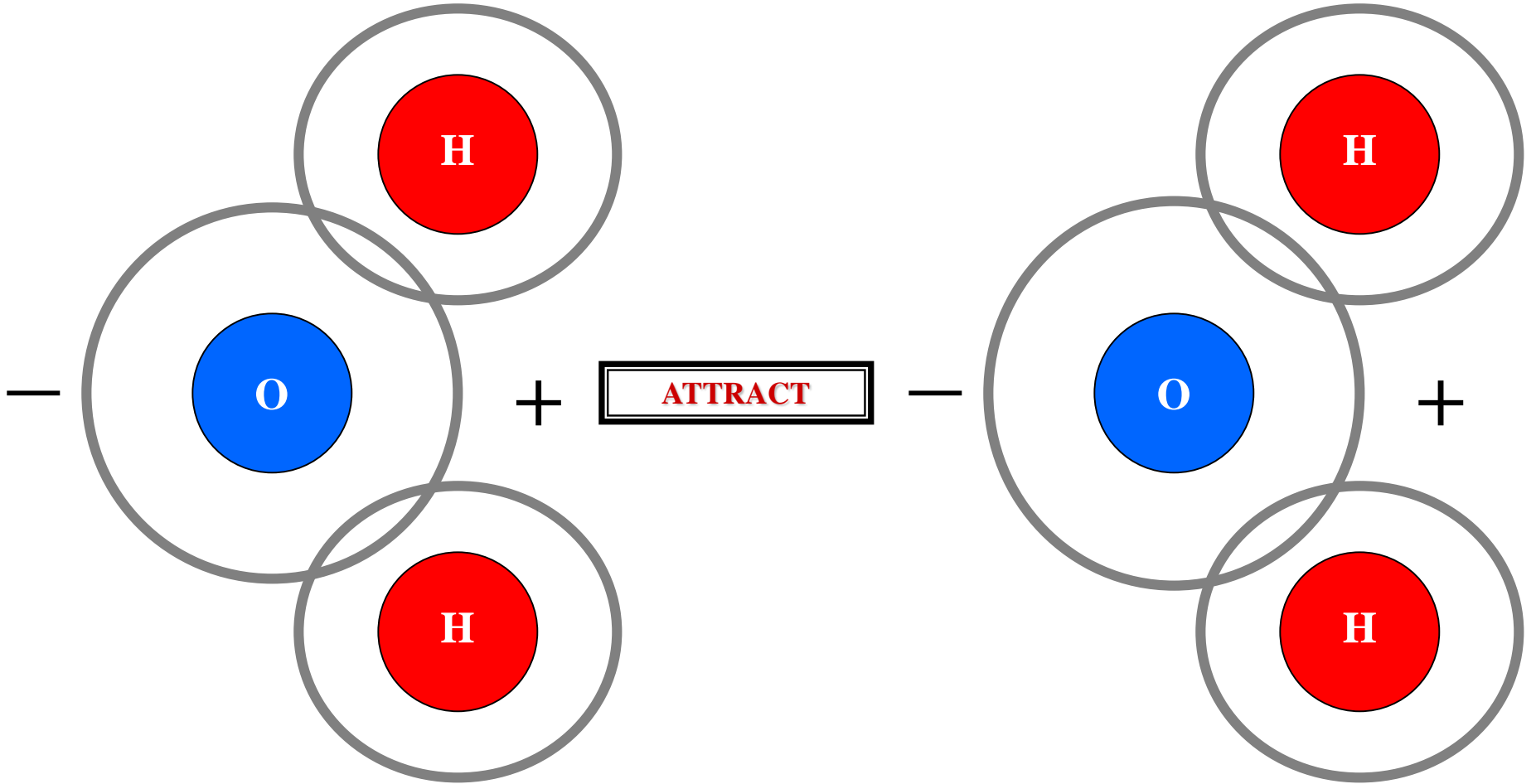


HYDROGEN POLE +



- **OXYGEN POLE**

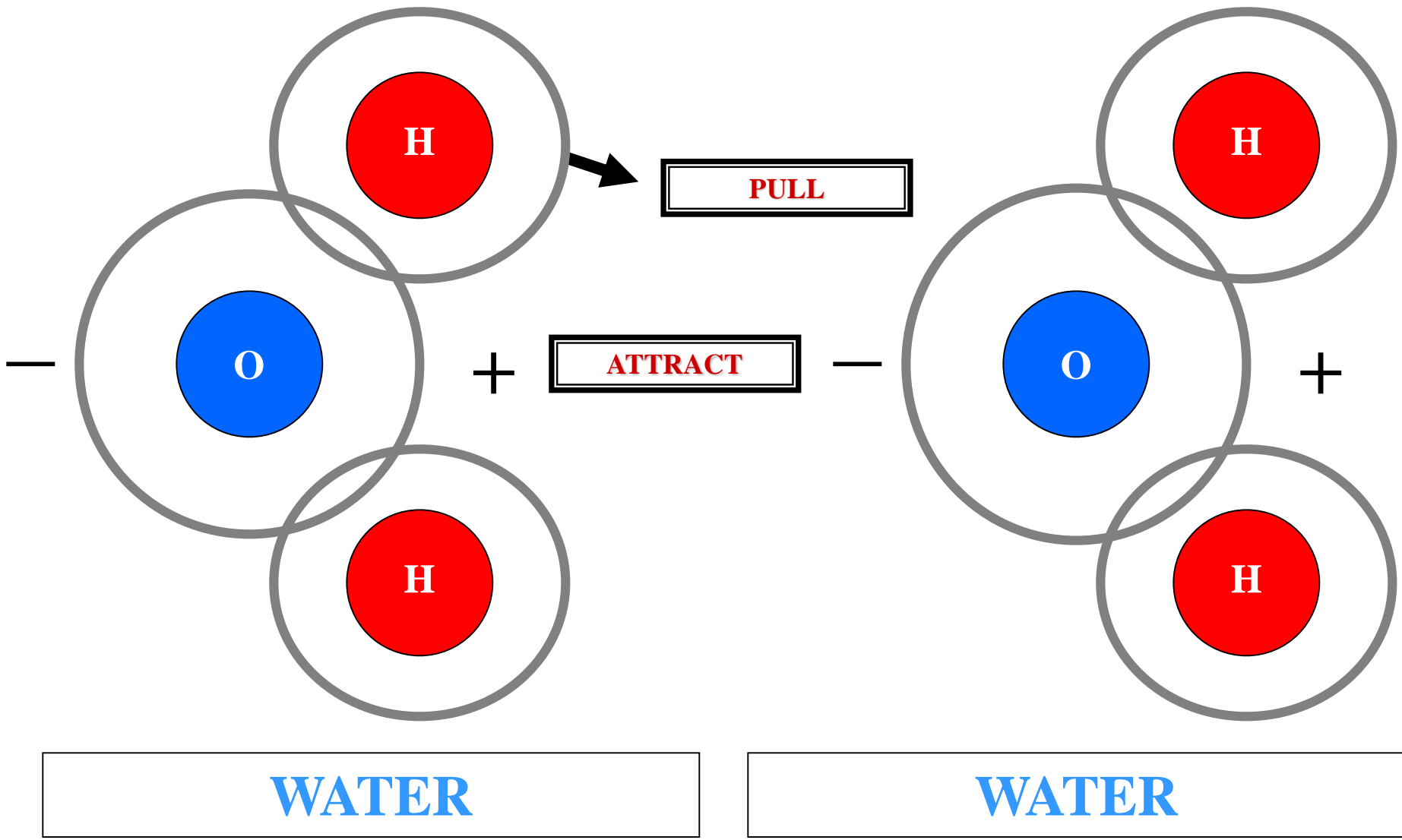
WATER MOLECULES



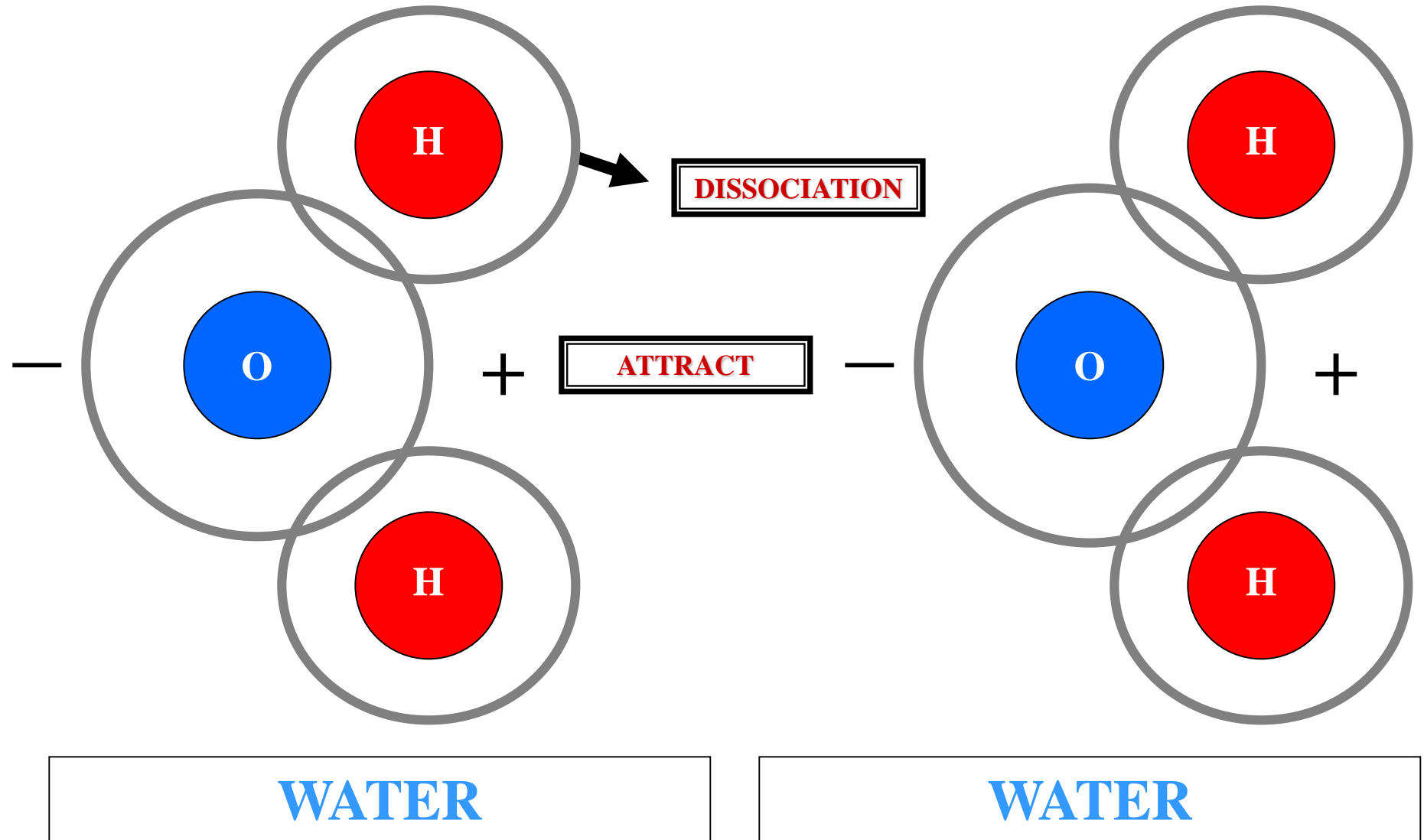
WATER

WATER

WATER MOLECULES

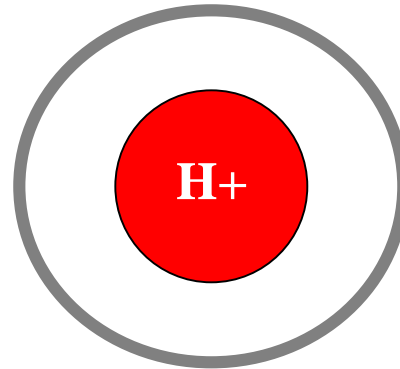
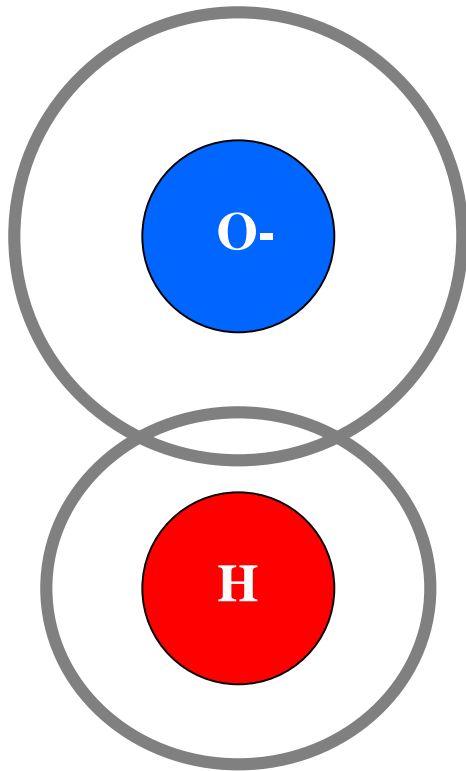


WATER MOLECULES

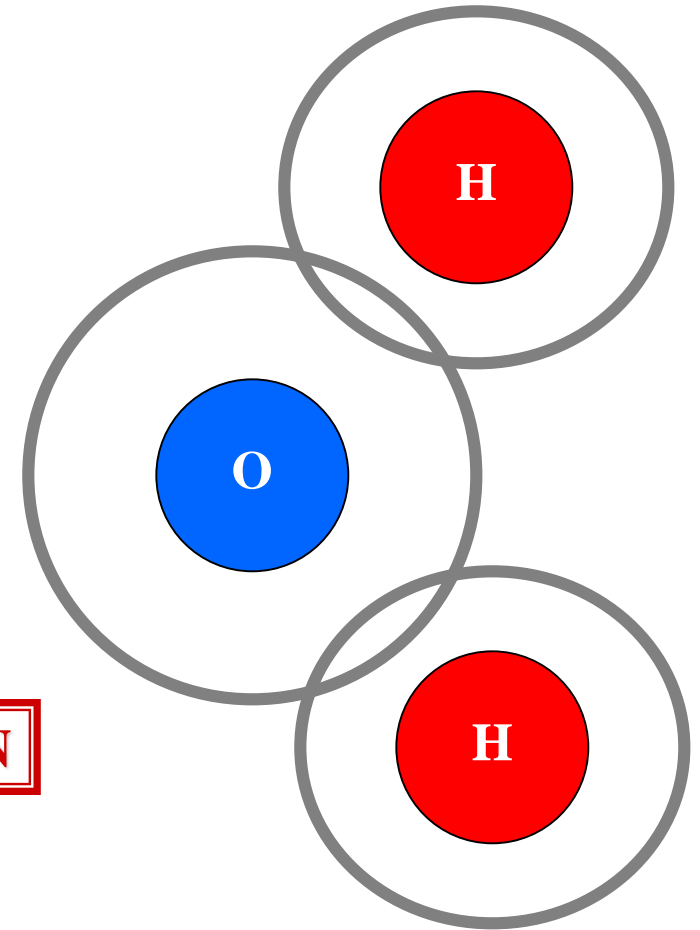


WATER DISSOCIATION

ION FORMATION



H^+ = HYDROGEN ION



WATER

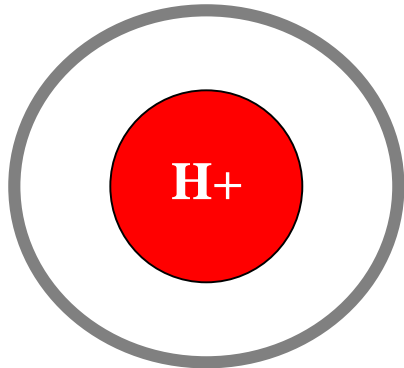
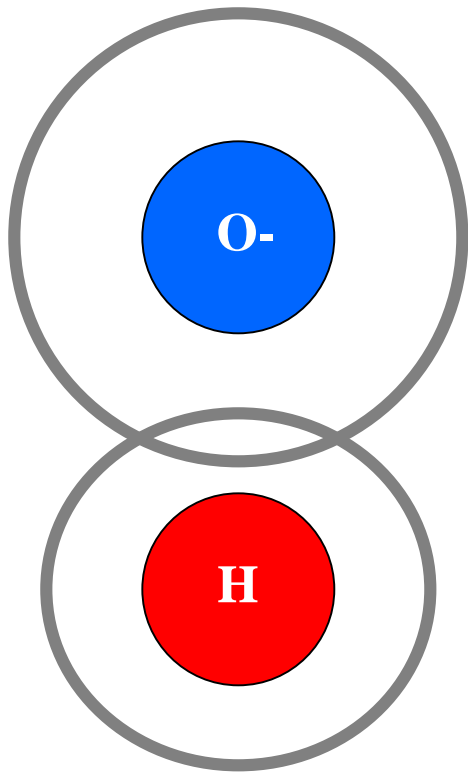
WATER DISSOCIATION



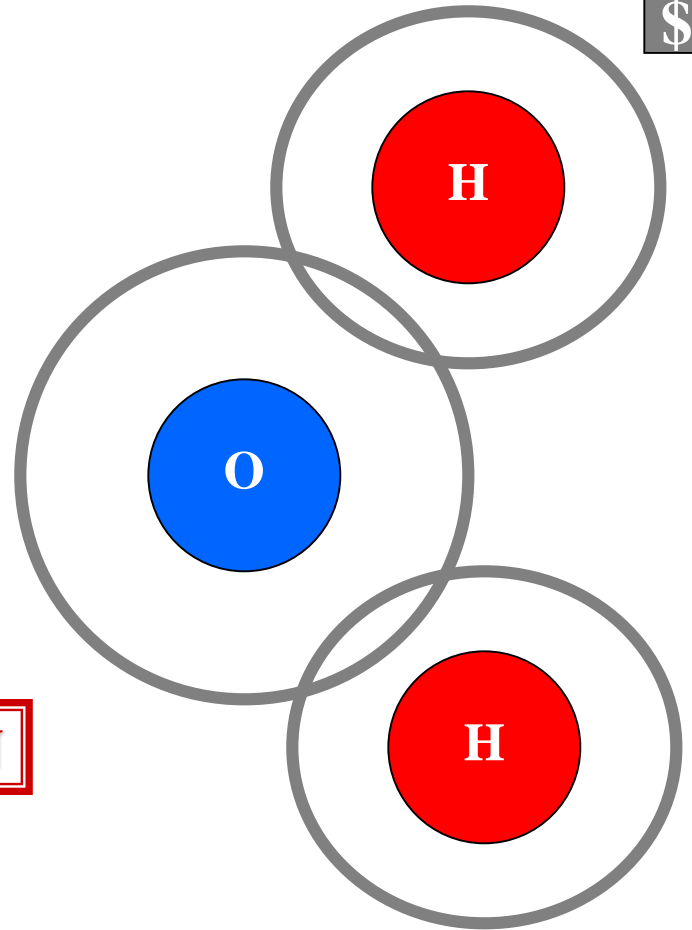
H₂O



ION FORMATION



H⁺ = HYDROGEN ION



-OH = HYDROXIDE ION

WATER