

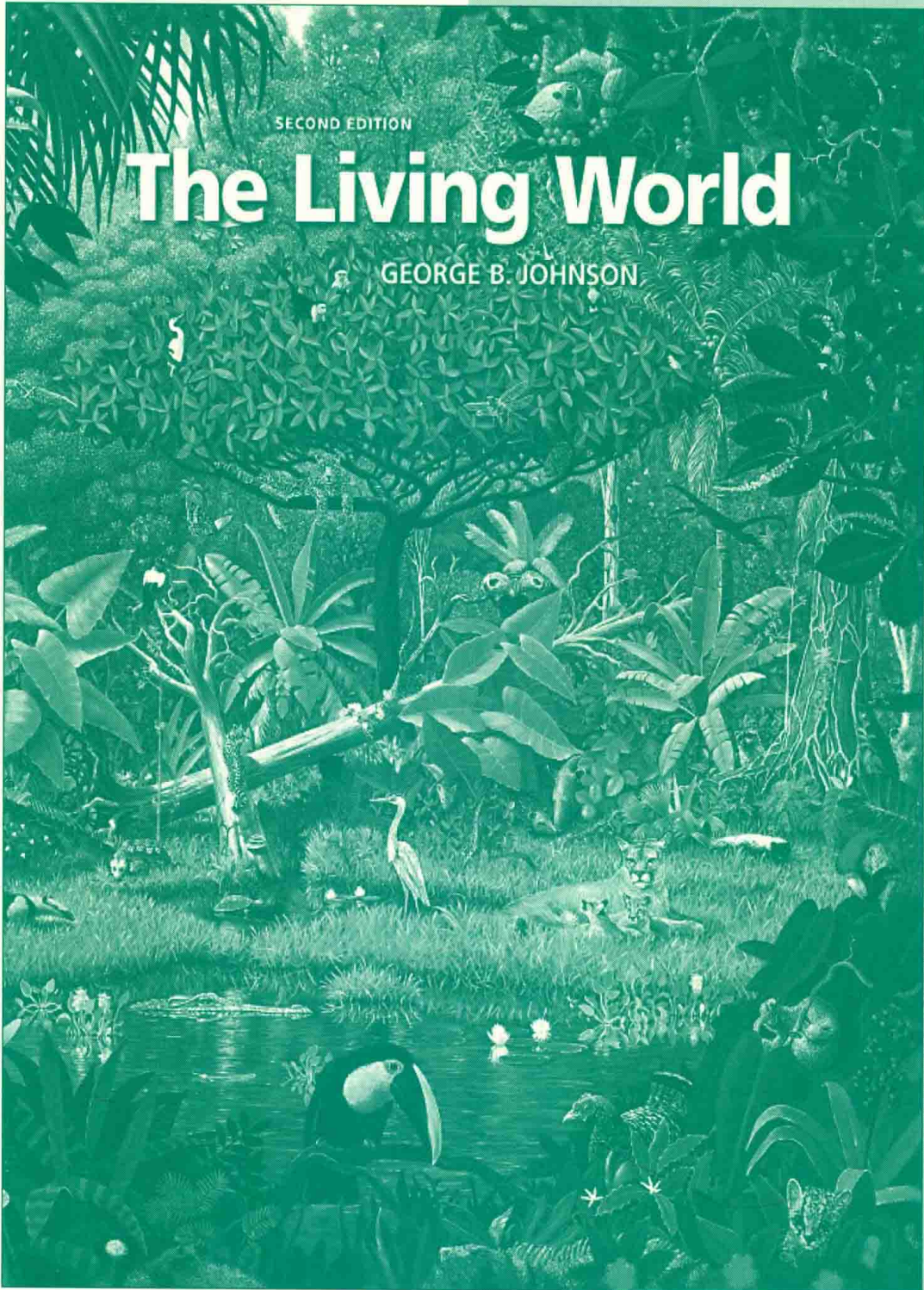
Ready Notes

to accompany

SECOND EDITION

The Living World

GEORGE B. JOHNSON



Ready Notes
to accompany
The Living World
Second Edition

George B. Johnson
Washington University



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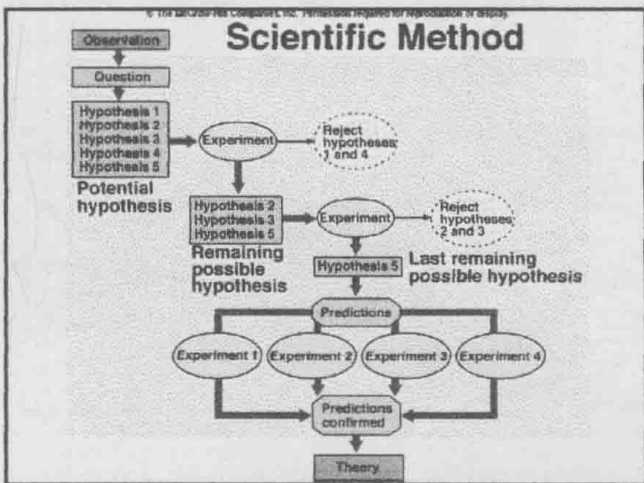
Chapter 1

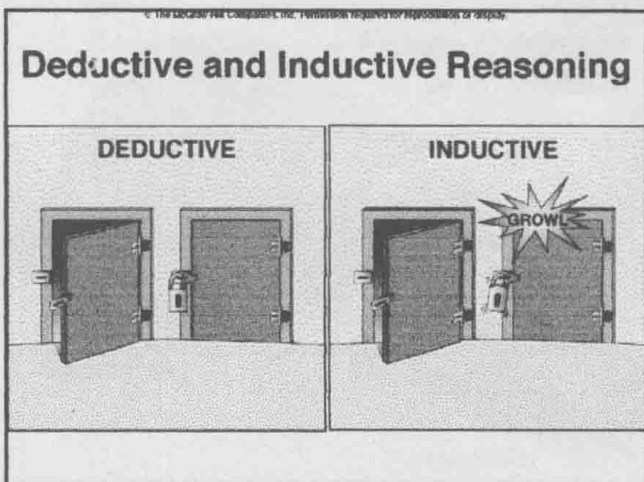
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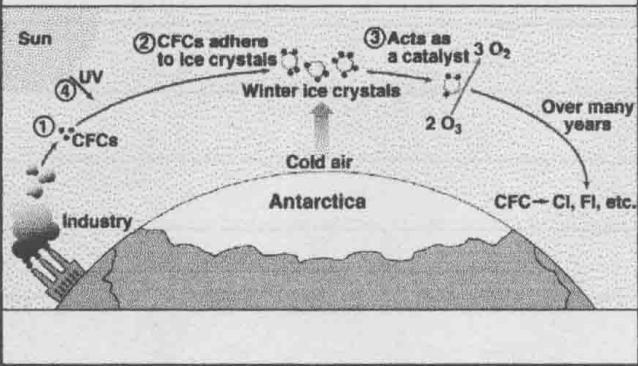
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How CFCs Attack and Destroy Ozone



Chapter 2

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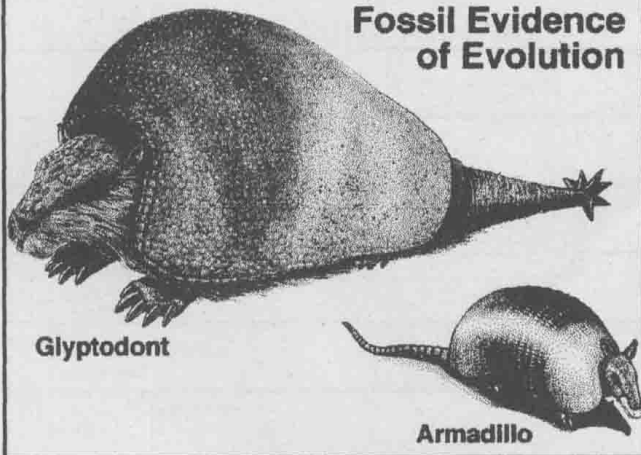
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H.M.S. Beagle Voyage



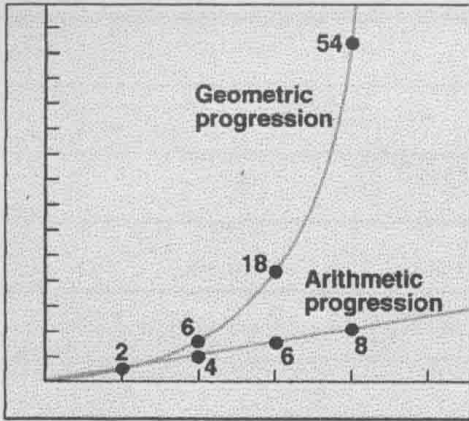
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Fossil Evidence of Evolution



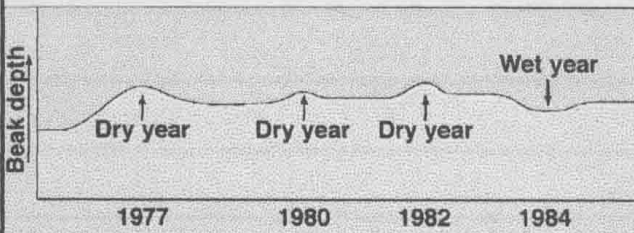
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Geometric and Arithmetic Progressions



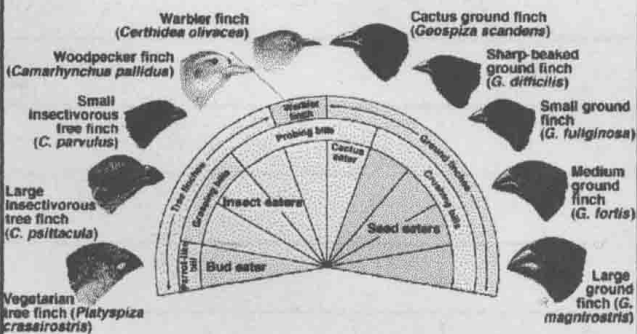
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Natural Selection and Beak Size



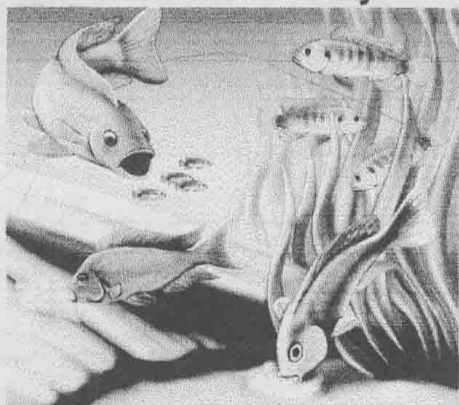
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Darwin's Finches



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Cichlid Diversity



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Periodic Isolation



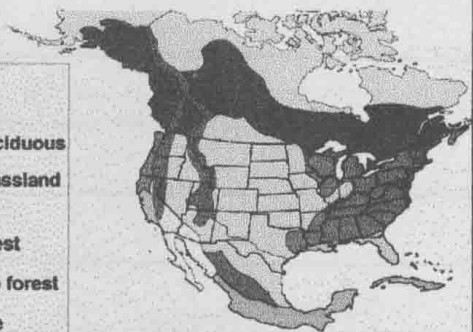
Glaciers link alpine zones into one continuous population → Glaciers recede → Mountain populations become isolated → Glaciers advance → Alpine zones are reconnected

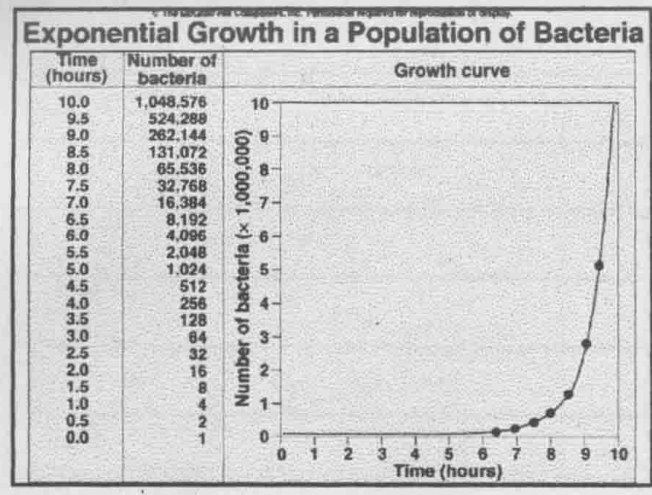
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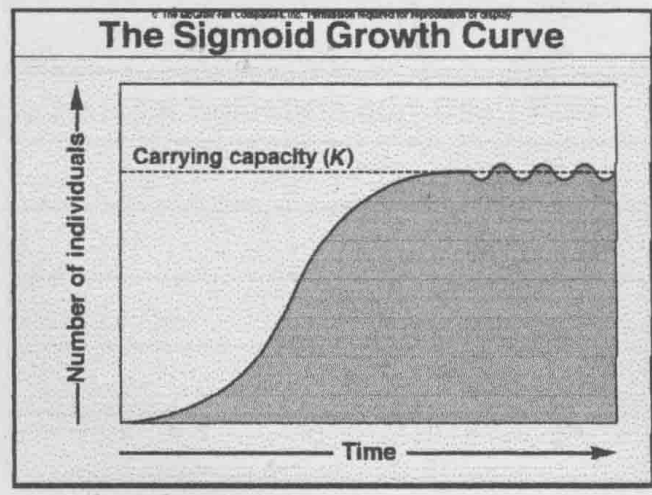
Biomes of North America

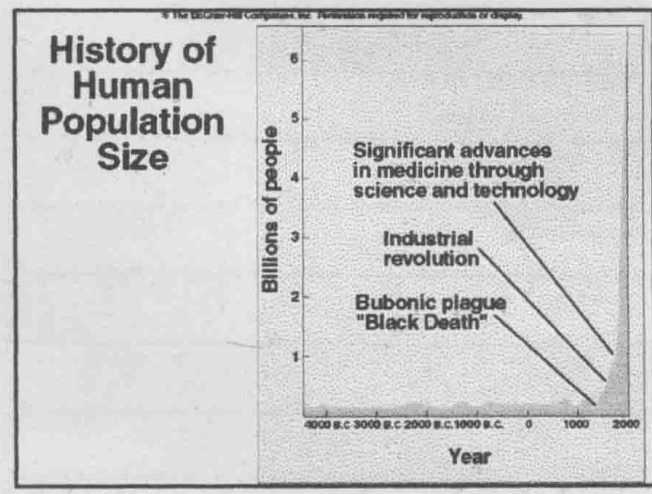
MAP KEY:

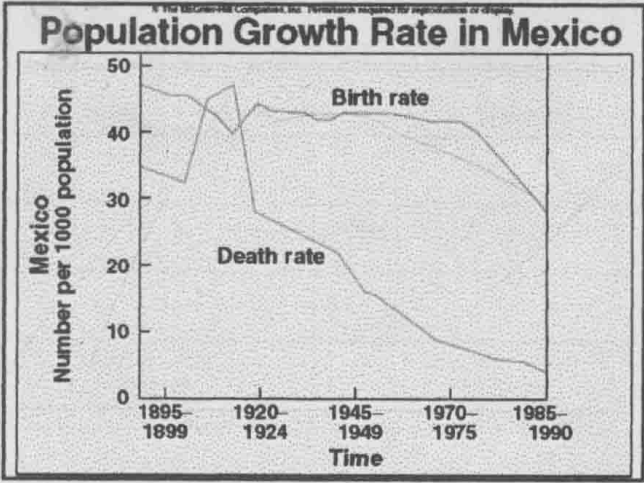
- Tundra
- Taiga
- Temperate deciduous forest
- Temperate grassland
- Chaparral
- Warm, moist evergreen forest
- Desert
- Tropical scrub forest
- Semidesert
- Mountain zone
- Temperate evergreen forest

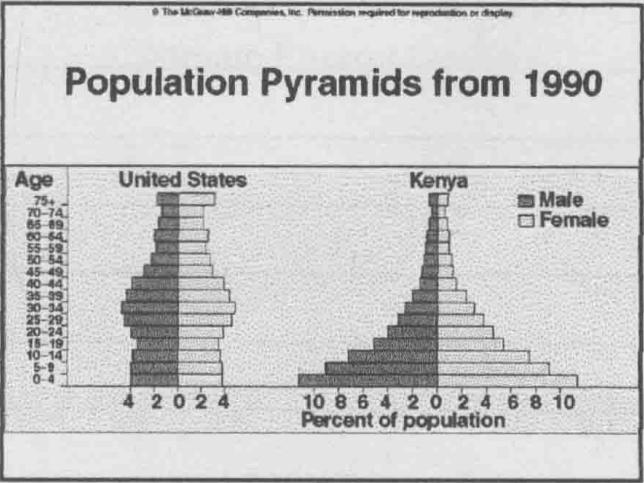


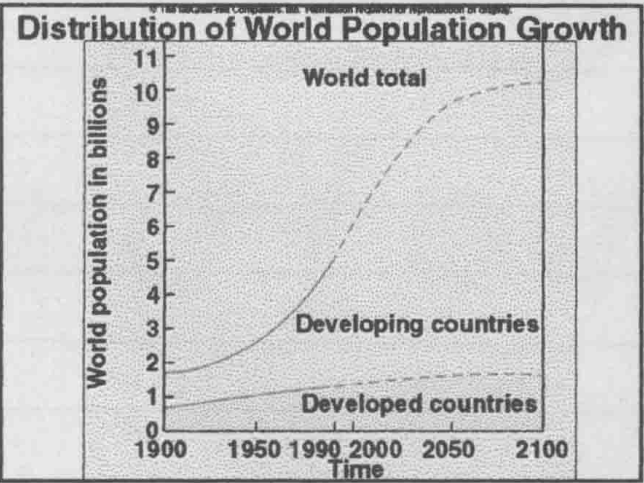












Chapter 3

The Living World

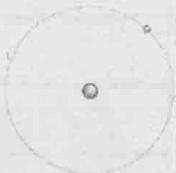
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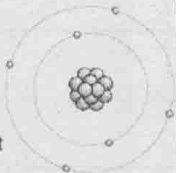
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Basic Structure of Atoms

Hydrogen
Nucleus contains
1 proton
1 electron in orbit
around nucleus



Carbon
Nucleus contains
6 protons
6 neutrons
6 electrons in orbit
around nucleus



Proton  Neutron  Electron 
(Positive charge) (No charge) (Negative charge)

Biological Macromolecules



Carbohydrate
(starch)



Lipid
(triacylglycerol)

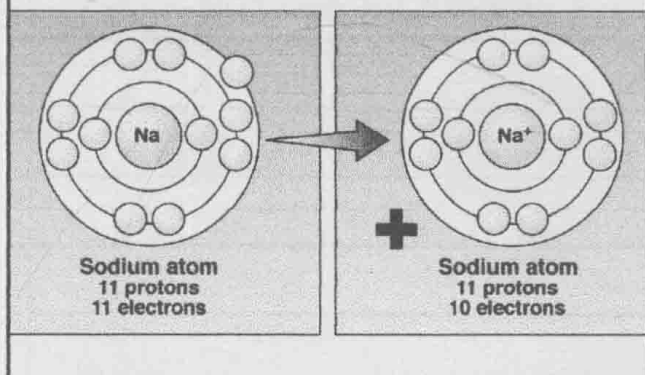


Protein
(enzyme)

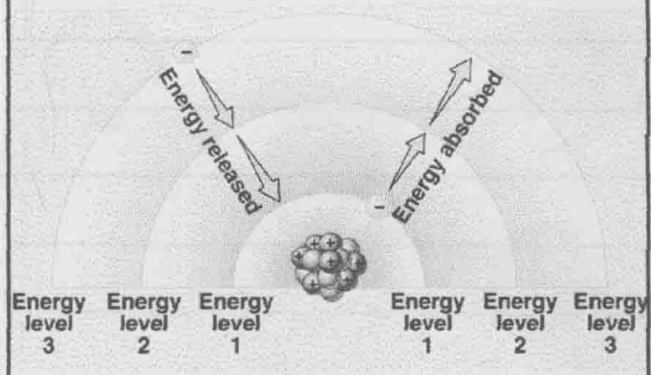


Nucleic acid
(DNA)

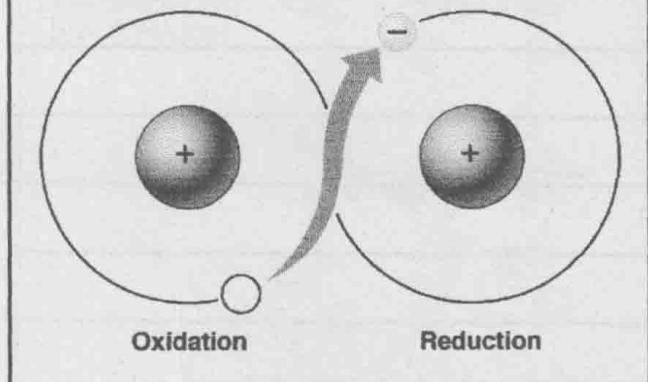
Making a Sodium Ion



Atomic Energy Levels



Oxidation and Reduction



Isotopes of the Element Carbon



Carbon-12
6 protons
6 neutrons
6 electrons

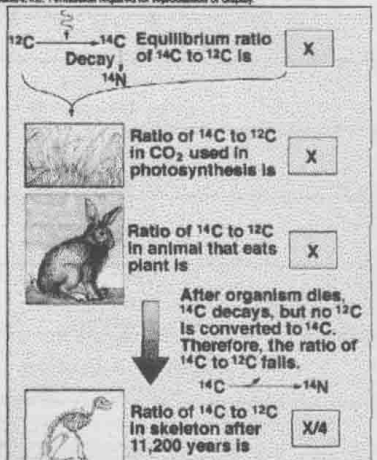


Carbon-13
6 protons
7 neutrons
6 electrons

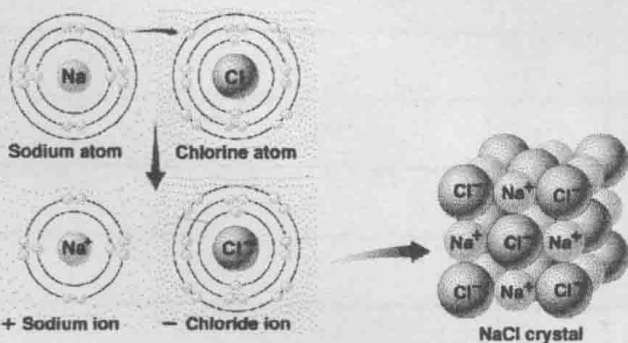


Carbon-14
6 protons
8 neutrons
6 electrons

Radioactive Isotope Dating

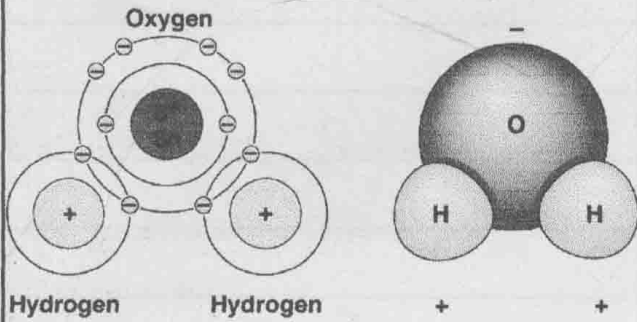


Ionic Bonds — NaCl



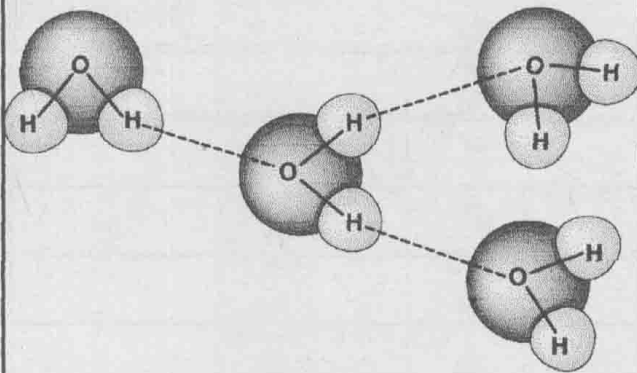
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Water Molecules Contain Two Covalent Bonds



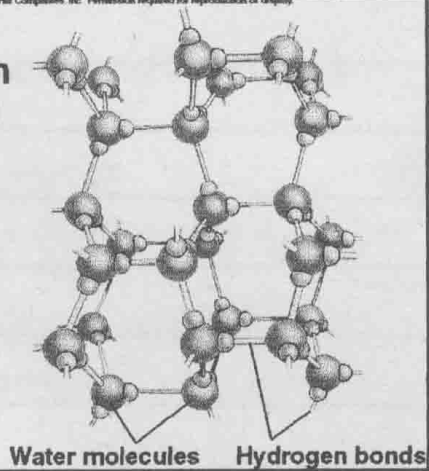
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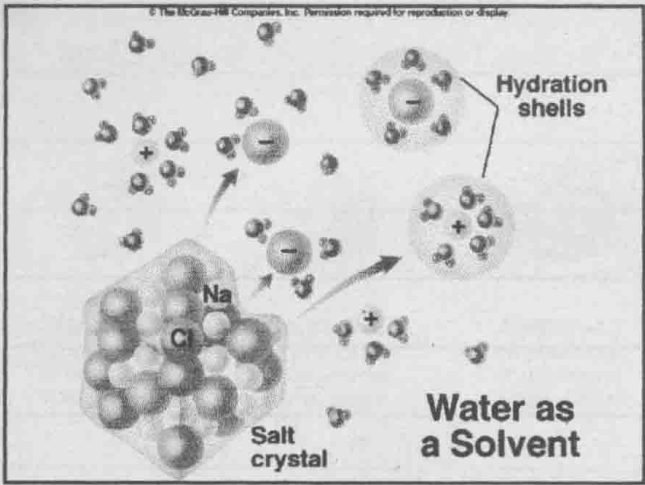
Hydrogen Bonding in Water Molecules



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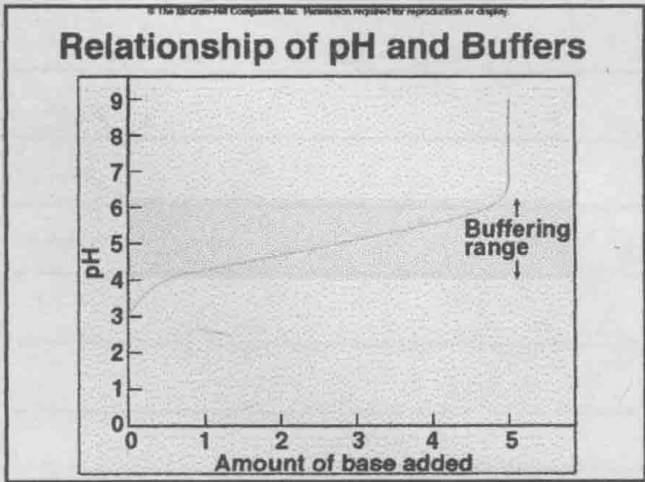
Hydrogen Bonds in an Ice Crystal



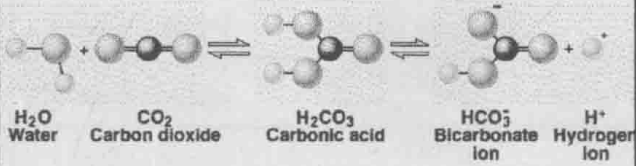


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pH Scale	H ⁺ Ion Concentration	pH Value	Examples of Solutions
	10^{-1}	1	Hydrochloric acid
	10^{-2}	2	Stomach acid
	10^{-3}	3	Lemon juice
	10^{-4}	4	Vinegar, cola, beer
	10^{-5}	5	Tomatoes
	10^{-6}	6	Black coffee
	10^{-7}	7	Normal rainwater
	10^{-8}	8	Urine
	10^{-9}	9	Saliva
	10^{-10}	10	Pure water
	10^{-11}	11	Blood
	10^{-12}	12	Seawater
	10^{-13}	13	Baking soda
	10^{-14}	14	Great Salt Lake
			Household ammonia
			Household bleach
			Oven cleaner
			Sodium hydroxide



Buffer Formation



The Six Principal Functional Groups

Group	Structural Formula	Ball-and-Stick Model	Found In:
Hydroxyl	$-\text{OH}$		Alcohols
Carbonyl	$-\text{C}-\text{O}$		Formaldehyde
Carboxyl	$-\text{C}(=\text{O})\text{OH}$		Vinegar
Amino	$-\text{N}(\text{H})_2$		Ammonia
Sulfhydryl	$-\text{S}-\text{H}$		Rubber
Phosphate	$-\text{O}-\text{P}(\text{O})_2-\text{O}-$		ATP

Dehydration and Hydrolysis

