

2015

UNIVERSITY SUMMER FORUM
Chemistry & Society

WITH **BASSAM Z. SHAKHASHIRI**

PROFESSOR OF CHEMISTRY

WILLIAM T. EVJUE DISTINGUISHED CHAIR FOR THE WISCONSIN IDEA

DIRECTOR, WISCONSIN INITIATIVE FOR SCIENCE LITERACY

DEPARTMENT OF CHEMISTRY

UNIVERSITY OF WISCONSIN-MADISON



Wisconsin Initiative for
Science Literacy

Purpose(s)

Expectations



SCIENCE IS FUN

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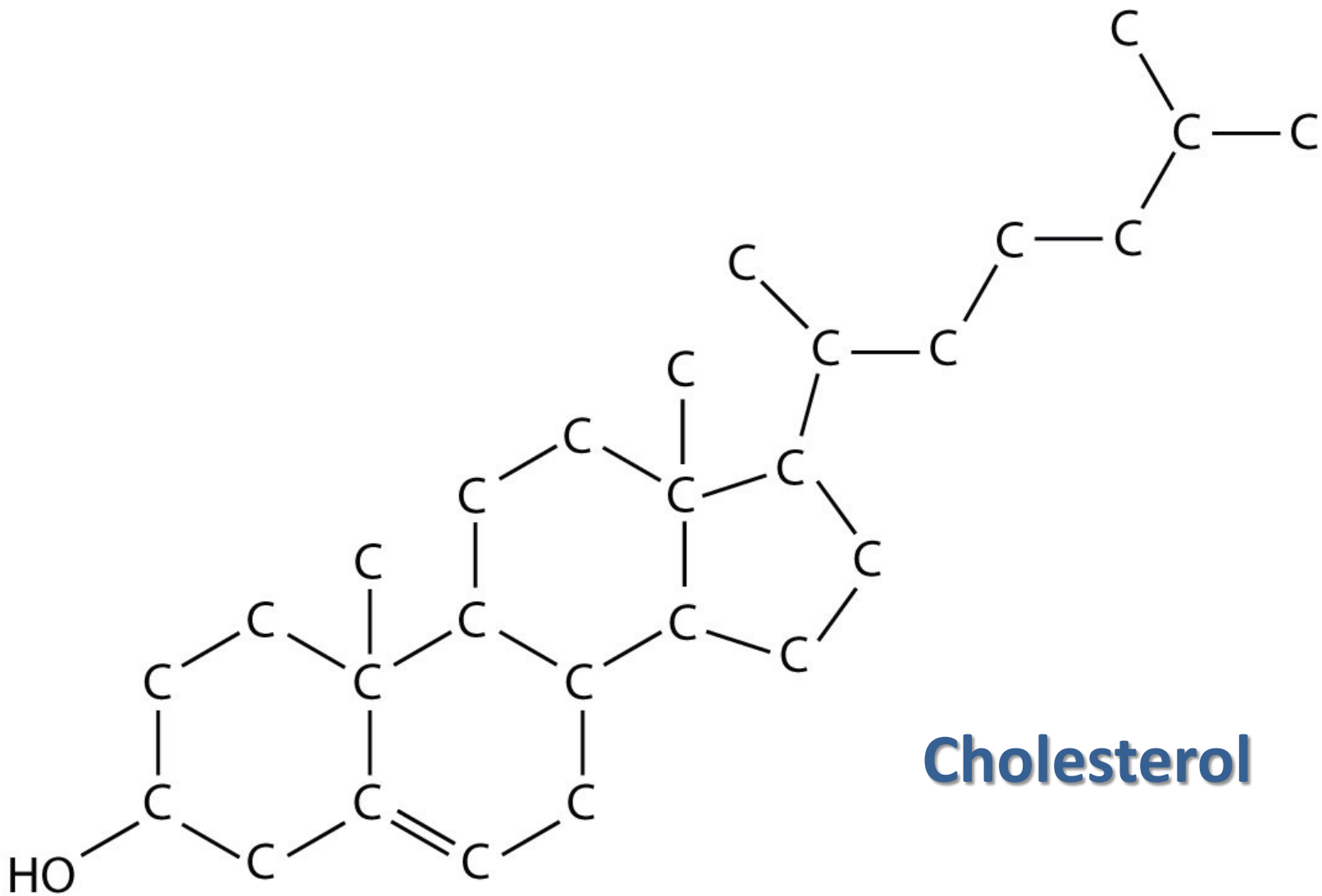
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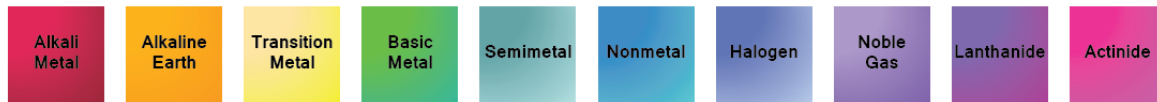
Cholesterol



Periodic Table of the Elements

1 IA 11A H Hydrogen 1.008	2 IIA 2A He Helium 4.003											13 IIIA 3A B Boron 10.811	14 IVA 4A C Carbon 12.011	15 VA 5A N Nitrogen 14.007	16 VIA 6A O Oxygen 15.999	17 VIIA 7A F Fluorine 18.998	18 VIIIA 8A Ne Neon 20.180
3 Li Lithium 6.941	4 Be Beryllium 9.012											5 Al Aluminum 26.982	6 Si Silicon 28.086	7 P Phosphorus 30.974	8 S Sulfur 32.066	9 Cl Chlorine 35.453	10 Ar Argon 39.948
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3 IIIB 3B	4 IVB 4B	5 VB 5B	6 VIB 6B	7 VIIB 7B	8 VIII 8	9 VIII 8	10 VIII 8	11 IB 1B	12 IIB 2B	13 Ga Gallium 69.732	14 Ge Germanium 72.61	15 As Arsenic 74.922	16 Se Selenium 78.97	17 Br Bromine 79.904	18 Kr Krypton 84.80
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.933	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.732	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.97	35 Br Bromine 79.904	36 Kr Krypton 84.80
37 Rb Rubidium 84.488	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.411	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [208.982]	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Ff Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [298]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

Lanthanide Series	57 La Lanthanum 138.906	58 Ce Cerium 140.115	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.966	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.930	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
Actinide Series	89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]



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CONNECTIVITY



Family
Friends
Neighbors
Community



**What differentiates our
society now from all
previous societies?**



Science



Science is Vital to Democracy



“Public sentiment is everything. With public sentiment, nothing can fail; without it nothing can succeed.”

>> Abraham Lincoln



Respect

Trust

Confidence



Industrial Revolution

Electronic Revolution





Grand Challenges to Society and to Scientists

Help sustain Earth and its people in the face of:

- Population Growth
- Finite Resources
- Malnutrition
- Spreading Disease
- Deadly Violence
- War
- Climate Change
- Denial of Basic Human Rights, *especially the right to benefit from scientific and technological progress*







Wisconsin Initiative for
Science Literacy





Our planet has changed and continues to do so.

Ice has melted.



**Grinnell Glacier, Glacier Nat'l Park
1940**



2006





The Wisconsin Idea





Wisconsin Initiative for
Science Literacy



The Wisconsin Idea



**The boundaries of
campus are the
boundaries of the state.**



In recent decades the borders of the University have expanded to the borders of the nation, the world and beyond. Today the University draws students from around the world, sends researchers to every part of the world, and sends experiments into space.



“The Wisconsin tradition meant more than simple belief in the people. It also meant a faith in the application of intelligence and reason to the problems of society. It meant a deep conviction that the role of government was not to stumble along like a drunkard in the dark, but to light its way by the best torches of knowledge and understanding that it could find.”

—Adlai Stevenson II



Stephen Babcock

Milk Quality

Harry Steenbock

Vitamin D

Karl Paul Link

Warfarin

John Witte, John Commons & Arthur Altmeyer

Social Security

Verner Suomi

Weather Satellite

Steve Carpenter

Fresh Water



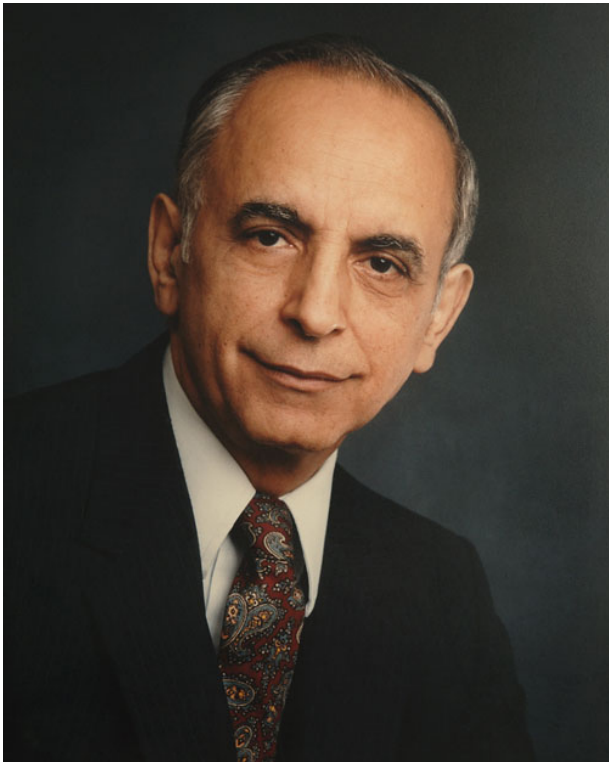


A Friend of the Sun

In the 1950s, long before “alternative energy” was coined, chemist **Farrington Daniels** became an advocate of solar energy. As director of the Solar Energy Laboratory, he explored the sun’s use for heat, electricity, cooking and industrial processes, and early on recognized that solar energy could play a major role in developing countries.



Manucher J. Javid



- Chairman of UW's Department of Neurosurgery for 33 years before retiring in 1998
- Operated on UW boxer Charlie Mohr after he was badly injured in the April 1960 NCAA Boxing Finals
- Mohr's death, and the testimony Javid gave about his severe brain injury, convinced UW (and eventually the NCAA) to drop boxing as a collegiate sport



The Strongest Forces in Society

Religion

Science



Evolution

Climate Change





<http://scifun.org/CHEMWEEK/Water/COW-Water-Feb2015.pdf>



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