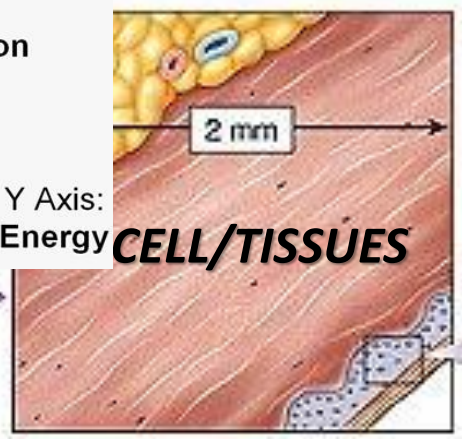
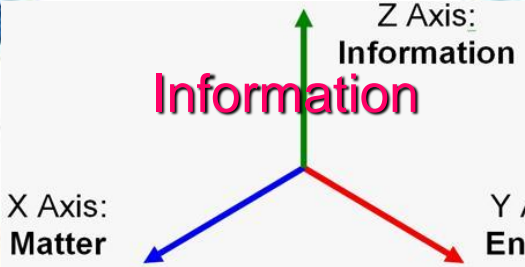
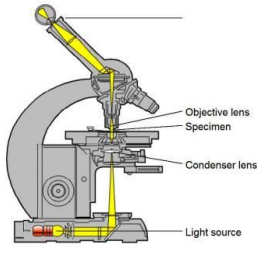


# HANDOUTS WK 2 DNA, RNA, CRISPR

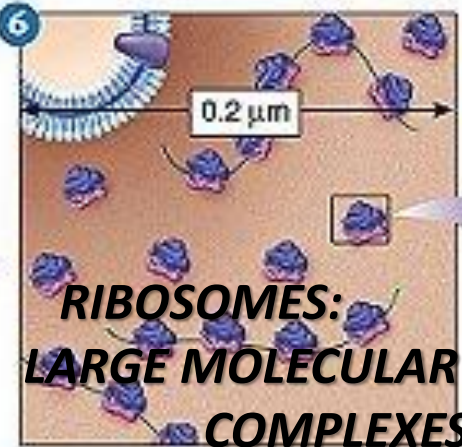
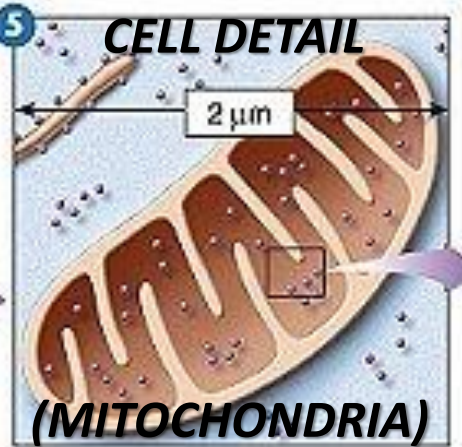
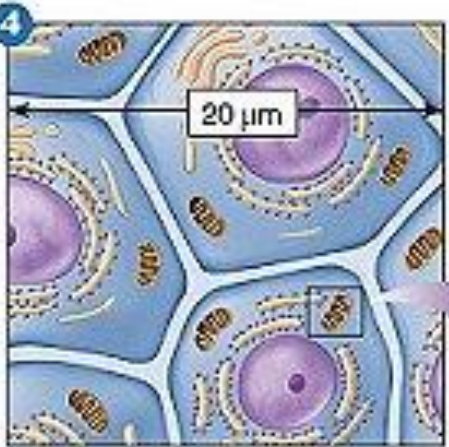
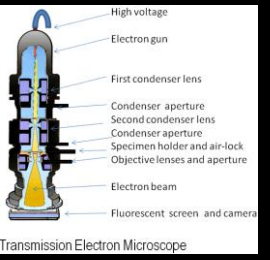
**OPTICAL  
LIGHT  
500 yrs**



mm=.001M  
(1/1000 meter)

**10<sup>-3</sup> Meters**

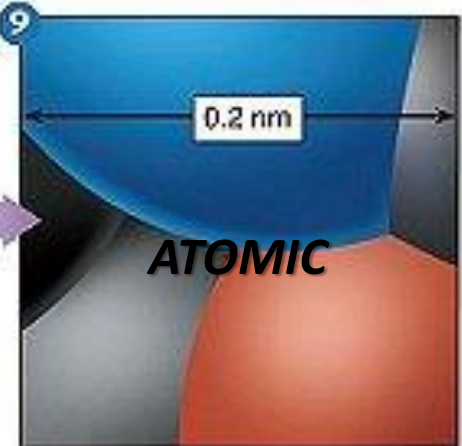
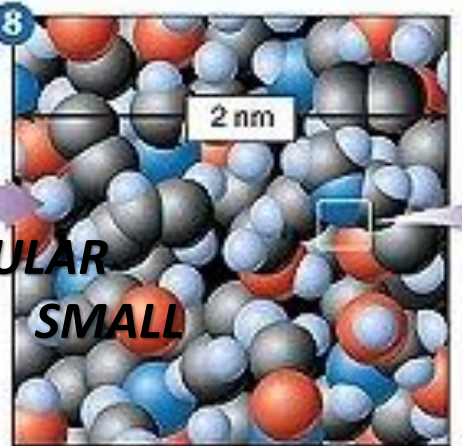
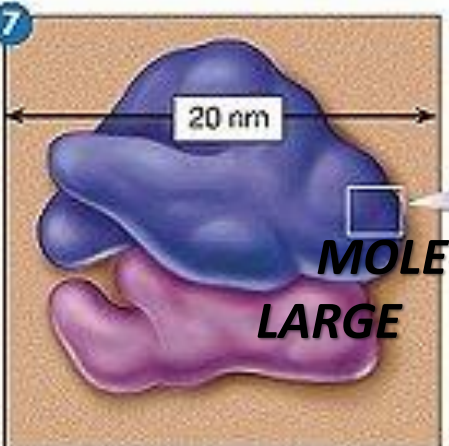
**ELECTRONS  
90 yrs**



micrometer  
(micron)=  
1 millionth of a  
meter

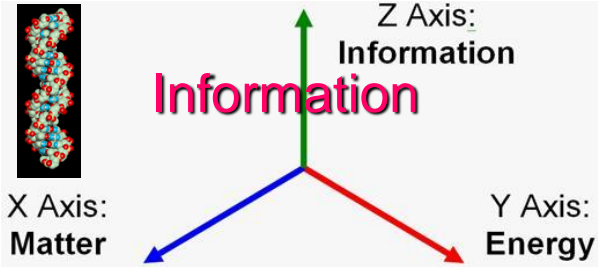
**10<sup>-6</sup> Meters**

**SINGLE  
PARTICLE  
CRYO-  
ELECTRON  
MICROSCOPY  
30 yrs**



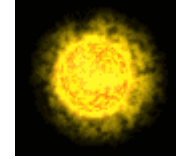
nanometer=  
1 billionth of a  
meter  
**10<sup>-9</sup> Meters**

*Capillary pore= 6 nm  
AVERAGE ATOMIC SIZE= H2O=0.3 nm  
Hydrogen atom=0.1 nm=100pm=1A*

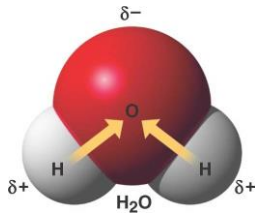


C, N, O, H  
P, Na, K, Cl  
(Atoms)

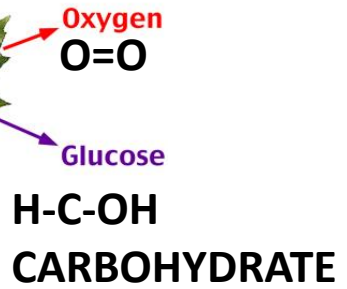
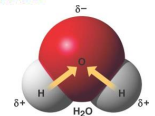
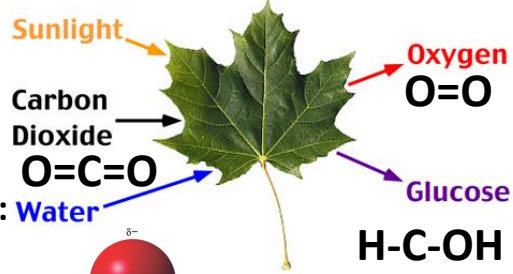
# MOLECULES OF LIFE: AND THEIR CHARGES



Energy Source?



THE CENTRAL MOLECULE: **Water**  
WATER  
3 ATOMS IN HYBRID  
SHARING OF ELECTRONS



BIRTH



DEATH

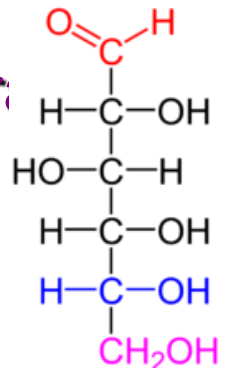
GROWTH



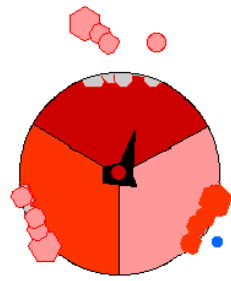
DECLINE

Energy storage  
**ATP**

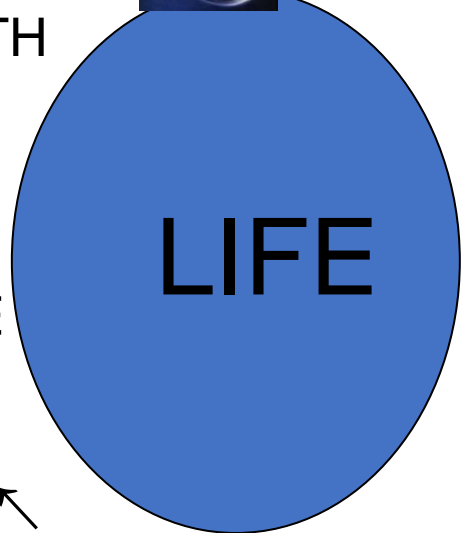
REPRODUCTION



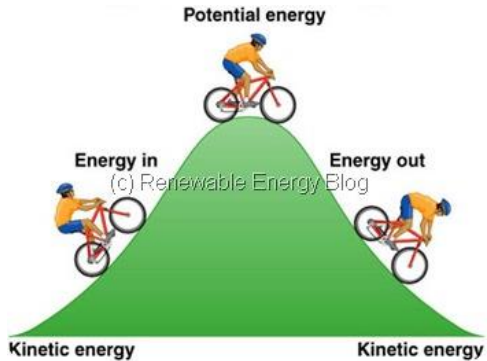
Adenosin  
Triphosphate



ATP-Synthase  
Machine



MATURITY



**Glucose**

**CHEMICAL POTENTIAL ENERGY**  
**CONCENTRATION: MOLECULES/CHARGE**