HANDOUTS WK 2 DNA, RNA, CRISPR
AVERAGE ATOMIC SIZE = H2O = 0.3 nm

Capillary pore = 6 nm

Hydrogen atom = 0.1 nm = 100 pm = 1 Å

micrometer (micron) = 1 millionth of a meter

10^-3 Meters

10^-6 Meters

10^-9 Meters

OPTICAL LIGHT 500 yrs

ELECTRONs 90 yrs

SINGLE PARTICLE CRYO-ELECTRON MICROSCOPY 30 yrs
**MOLECULES OF LIFE: AND THEIR CHARGES**

- **BIRTH**
  - Water: $\text{H}_2\text{O}$
  - 3 atoms in hybrid sharing of electrons

- **GROWTH**
  - Adenosine Triphosphate (ATP)
  - Energy storage

- **DEATH**
  - Adenosine Triphosphate (ATP)
  - Energy release

- **DEcline**
  - ATP-Synthase Machine

- **MATURITY**
  - Chemical potential energy

- **Energy Source?**
  - Sunlight
  - Oxygen: $\text{O}_2$
  - Carbon Dioxide: $\text{CO}_2$

**MOLECULES OF LIFE: C, N, O, H, P, Na, K, Cl (Atoms)**

**CHEMICAL POTENTIAL ENERGY**

**CONCENTRATION: MOLECULES/CHARGE**