

Chapter 1

Scientific method (fig 1.2)

- Make an observation
- Form a **hypothesis** (A tentative explanation, educated guess)
- Make a prediction (If then statements)
- More observations (Maybe from experiments, could change or reject your hypothesis)
- **Theory**-when you have LOTS of observations to support a hypothesis

Meerkats

- Guarding hypothesis
- Experiments:
 - o Introduce predator and note response (vary social group size, and predator type)
 - o Introduce food and note response

Characteristics of life

- Water Bears (tardigrade)
 - o .1-.5 mm long
 - o lack circulatory and respiratory system
 - o can reduce body water from 85% to 3% for up to 10 years
 - o how can you tell when they're alive at 3% body water?
- Life is:
 - o Cellular respiration: acquiring and using energy

- o Neuroactivity: communication and interaction with external environment
- o Reproduction
- o Structural complexity
- o Evolution → measured at population level over generations
- **Cell:** the simplest self-replicating entity that can exist as an independent unit of life
 - o Contain and use information
 - o Bounded/surrounded by a plasma membrane (fig 1.14)
 - o Obtain and use energy from the environment
- **Prokaryotic cell:** (bacteria)
- **Eukaryotic cell:** (yeast)
- **Protist:** a single cell eukaryote

The unity and diversity of life are explained by evolution

- **Evolution**
 - o Changes in the genetics of a population over time
 - o There was a single origin of life, and thus all life forms share some characteristics
 - o New species arose by the divergence of populations over time
- Bacteria and archaeons look alike, but archaeons have more in genetically common with eukaryotes (fig 1.17)

Organisms interact with each other and the environment

Chapter 2

2.1 Properties of Atoms

- Elements-fundamental substances combined in various ways
 - o Earth, air, fire, water
- Atom-basic unit of matter
- Atomic mass-protons+neutrons
- Atomic number-protons
- Isotopes-atoms of the same element that have different numbers of neutrons
- Ions-electrically charged atoms
- Orbital-a region in space where an electron is present most of the time
 - o Most of the time the electron is within the sphere but it's exact position at any moment is unpredictable
 - o Max # of electron in any orbital is 2
- shell-given energy levels where orbitals exist
 - o first shell can have a max of 2, all after can have a max of 8
- periodic table
 - o all elements in a given row have the same number of shells and same number and types of orbitals
 - o all elements in vertical column are called a group/family and have same number of electrons in outermost shell

Organic Molecules

2. Nucleic acids

- Are polymers of [nucleotides](#)
- Store express and transmit genetic information
- DNA & RNA are the polymers made from nucleotides
- Nucleotides have 3 part structure: (Fig. 2.18)