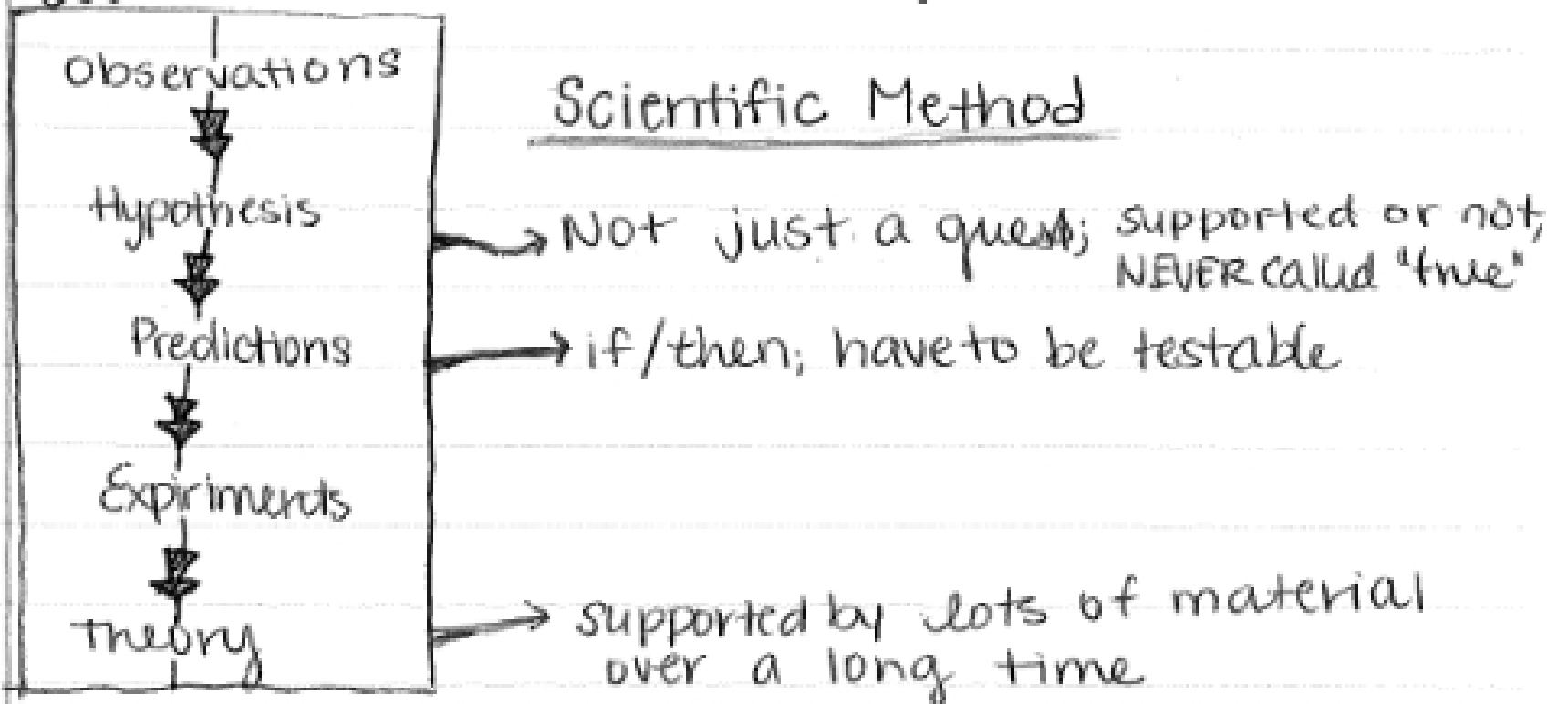


Bio 2150

Ch 1: Chemical, Cellular, & Evolutionary Foundations



What is Life?



Earth's crust
O & Si



Humans
O, C, & H

some Physics...

1st Law of Thermodynamics

- E can't be created or destroyed
- only transformed

2nd Law of Thermo.

- Degree of disorder \uparrow over time
 \hookrightarrow Entropy measures disorder

Nucleic Acids - all living organisms use DNA



* Not really a focus in 2150

'Tree of Life' - Plants, Eukaryotes (plants), Bacteria, Archaea (Animals)

\hookrightarrow Viruses are not life

Basic Genetics (in ch.15)

(I) 4 classic molecules that are signature of life

1. Nucleic Acids
2. Proteins
3. Carbohydrates
4. Lipids

(II) What is a gene?

- def. → DNA sequence coding info. to make specific product
 - codes for proteins ("gene product")
 - ↳ are final product, or make final product
- How do genes encode info?
 - > order of nucleotides (instructions)
 - > DNA nucleotides: A, T, G, & C
 - > following order is important to avoid mutation
- * Transcription-
- * Translation-

(III) Mutations

- def. → change in DNA sequence
- could be harmful, beneficial, or have no effect
 - > Harmful mutations disappear
 - cannot pass code as easily (death, etc)
 - no reproduction, no passing code
- Produces different forms of protein
 - > genetic disorders
 - > altered structure = altered function

(IV) Geno vs. Pheno

- Genotype → Particular alleles w/in an individual
 - > ONLY 2 alleles (no matter how many available) ex.
- Phenotype → determined by genotype
 - > physical appearance of genotype

Geno:	Aa	BB	cc
Pheno:	brown/eyes	black/hair	curly/hair
alleles:	Aa	Bb	CcDd

Hemoglobin Example

A = normal
S = sickle cell

Genotype	Phenotype
HB^A / HB^A	→ "Normal"
HB^S / HB^S	→ "sickle cell anemia"
HB^A / HB^S	→ "normal carrier" * half abnormal hemoglobin actually equals a resistance to malaria.

(Geno & Pheno)

- > Genotype determines interaction w/ environment
↳ Phenotype is direct interaction
- If an allele is an advantage, it is more common in enviro.
↳ HB^A / HB^S would be higher where malaria is common

V. Chromosome stuff

- > Diploid → one allele from dad, 1 from mom
◦ a.k.a. "2n"
- > Homozygous (both alleles the same) - AA or aa
- > Heterozygous (2 different) - Aa
- > Meiosis

Genetic variation

- production of haploid gametes (sex chromosomes)
- Haploids - one allele of each gene
↳ "n" egg & "n" sperm



- results in VARIATION, all offspring different

VI. Variation (Enviro.)

- (Environmental) ↳ > More resources = more offspring
◦ even if similar or more advantageous
- (Genetic) ↳ > Mutation (ultimate variation)

