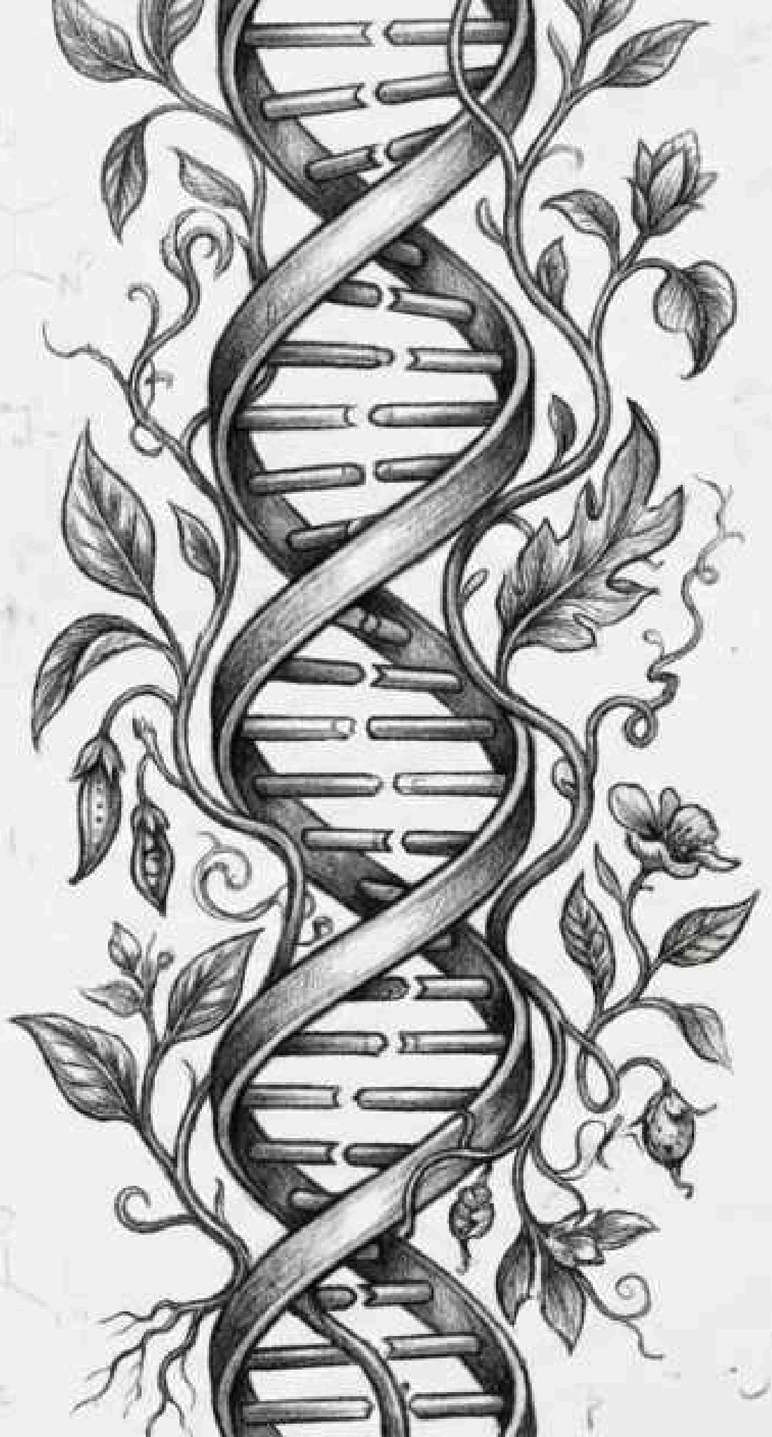


BIO 220 B: Ecology and Evolution

Lecture 0 — Course Overview

¶ 0.1

Tuition = Service to Humanity + Reflection



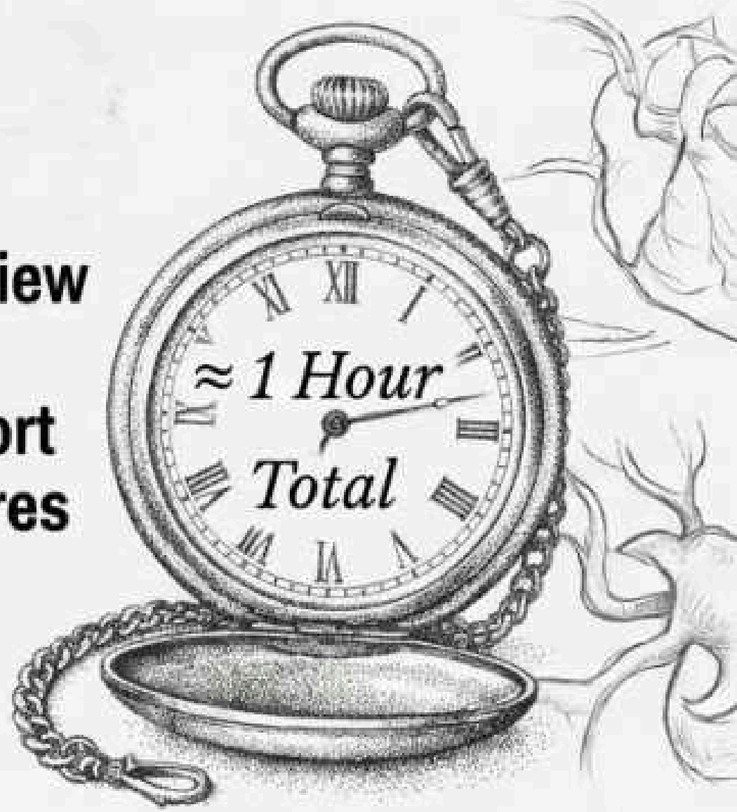
¶ 0.2

Anderson Academy
(4-year library of university-level courses)

BIO 220 B: Ecology & Evolution

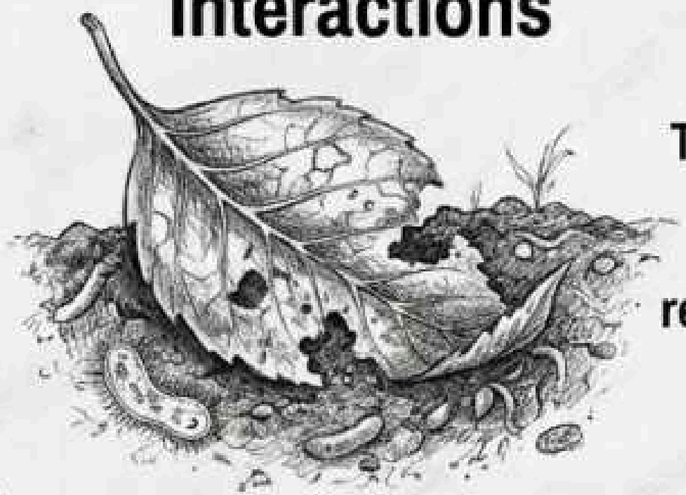
B = Brief

Overview + 6 short lectures



¶ 0.3

Ecology: Interactions



Life ↔ Life ↔ Environment

The environment shapes survival ↔ Evolving organisms reshape the environment.

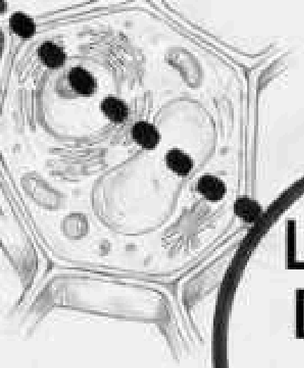
Evolution: Generational Change

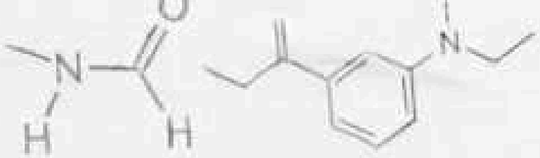


Change over time

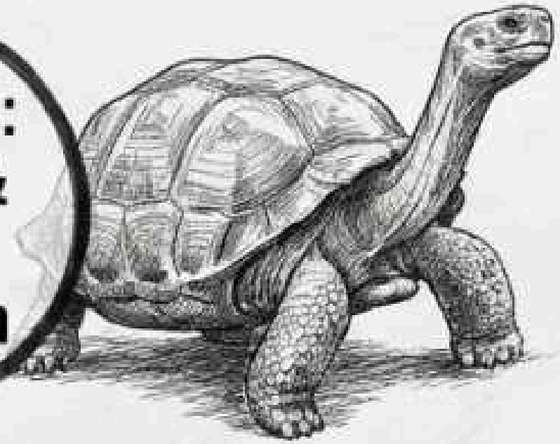
"Nothing in biology makes sense except in the light of evolution." — Theodosius Dobzhansky, 1973

$$\int_0^k f(x)\,dt = \int_0^\infty f(x)\,dx + \int_0^k f(x)\,dx$$





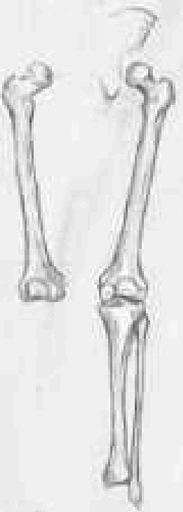
¶ 0.4



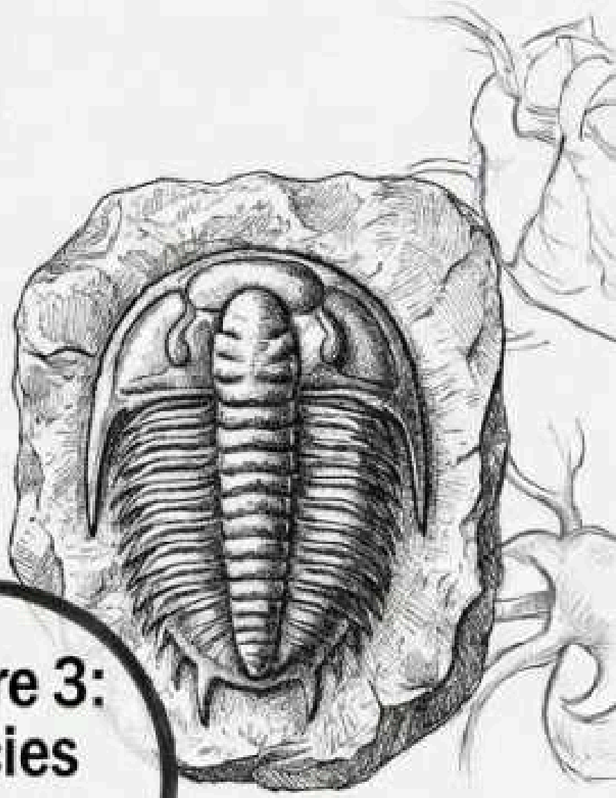
Lecture 1: Darwin & Natural Selection

	p	q
p	pb	pb
q	pb	qq

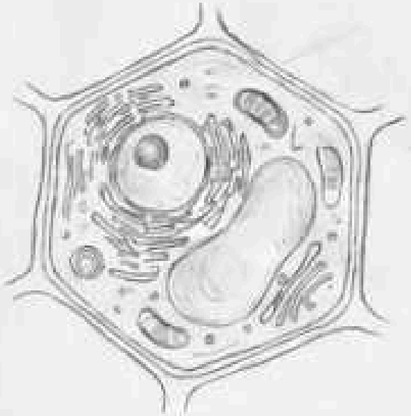
$$p^2 + 2pq + q^2 = 1$$



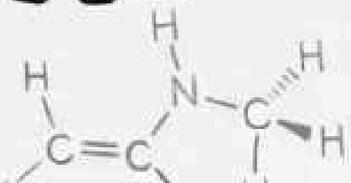
Lecture 2: Genetics & Mechanics

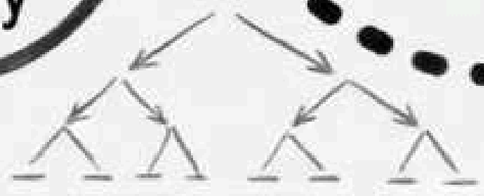


Lecture 3: Species & Deep History



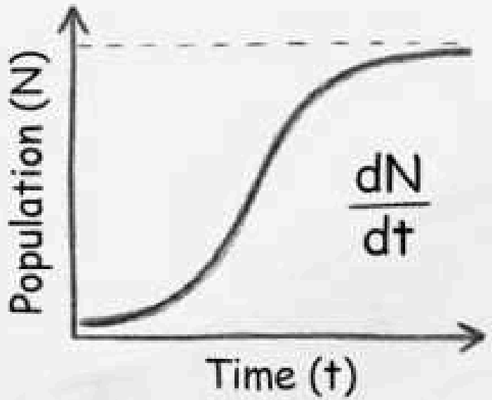
$$\int_0^a \int f(x)\,dx = \int f(x-a)\,dx$$



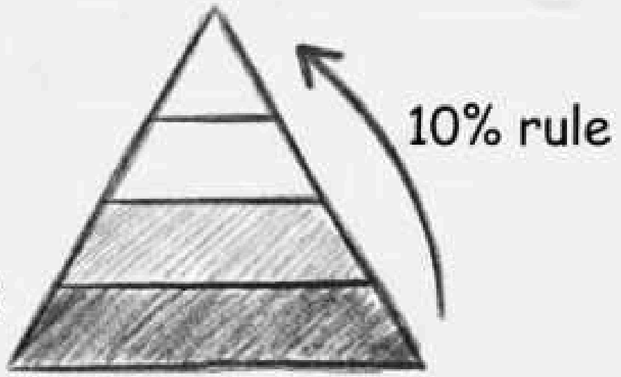


¶ 0.5

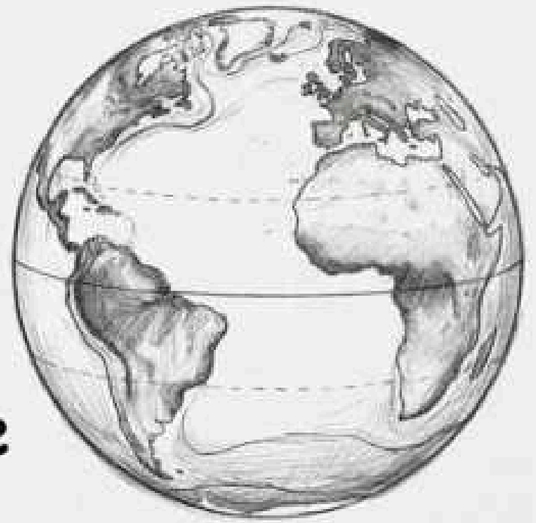
Lecture 4: Populations & Communities



Lecture 5: Ecosystems



Lecture 6: Humans & The Biosphere



$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$$

$$\int f(x)dt = F(t) + C$$

$$\Delta G = \Delta H - T\Delta S$$

¶ 0.6

BIO 220 B Core Ideas

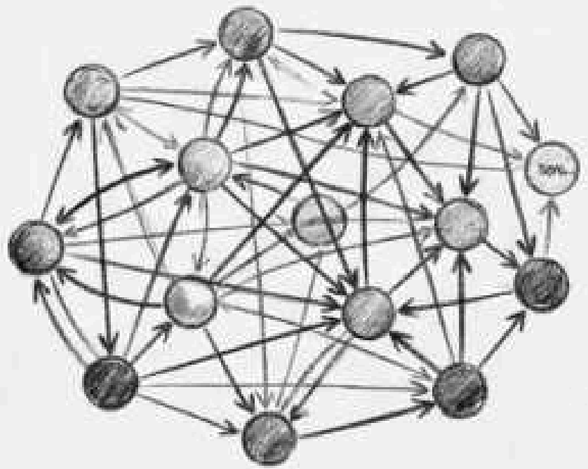
Natural Selection

Traits suited to environment
→ More offspring
→ Traits spread

$$w \geq 1$$

Interdependence

Species depend on each other and the physical world in complex webs of relationships



Change Over Time

Constant shifting of life on Earth over billions of years, continuing today

$$\Delta T_{billions}$$

$$\Delta G = \Delta H - T\Delta S$$

$$\frac{dN}{dt} = rN\left(1 - \frac{N}{K}\right)$$

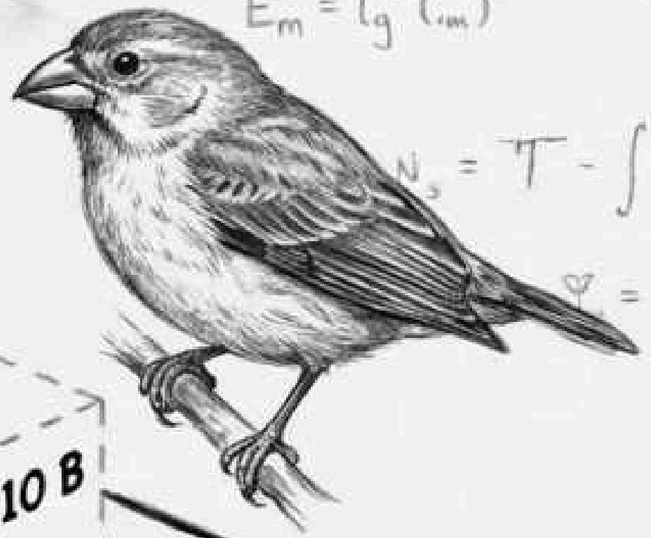
$$\int f(x)dt = F(t) + C$$

$$\text{Info}(m) = G\,\frac{\partial V}{\partial t}$$

¶ 0.7

Anchored by Vivid, Concrete Examples.





BIO 101 B, 120 B, 210 B (Genetics)

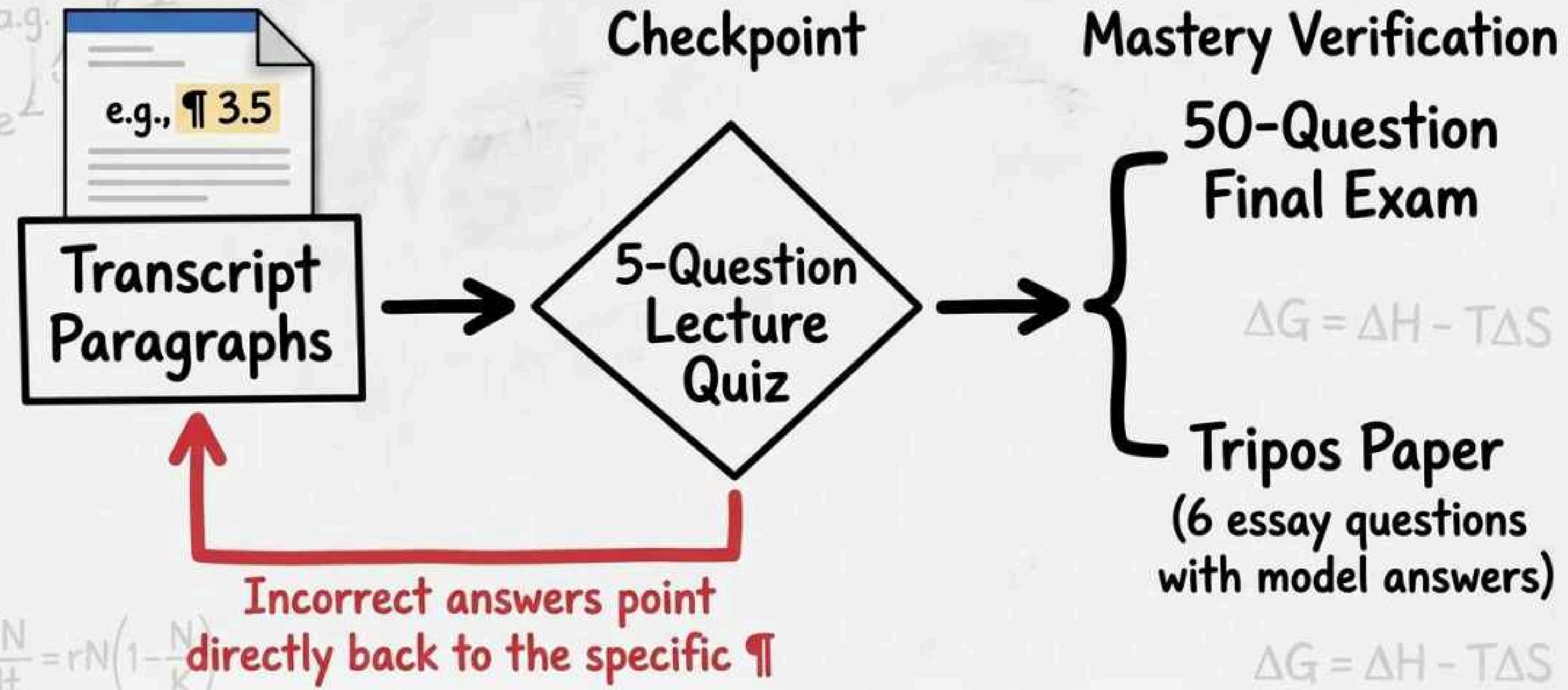
High School Biology (Required Base)

BIO 101 B, 120 B, 21, 210 B (Helpful Additions)

$$\Delta G = \Delta H - T\Delta S$$

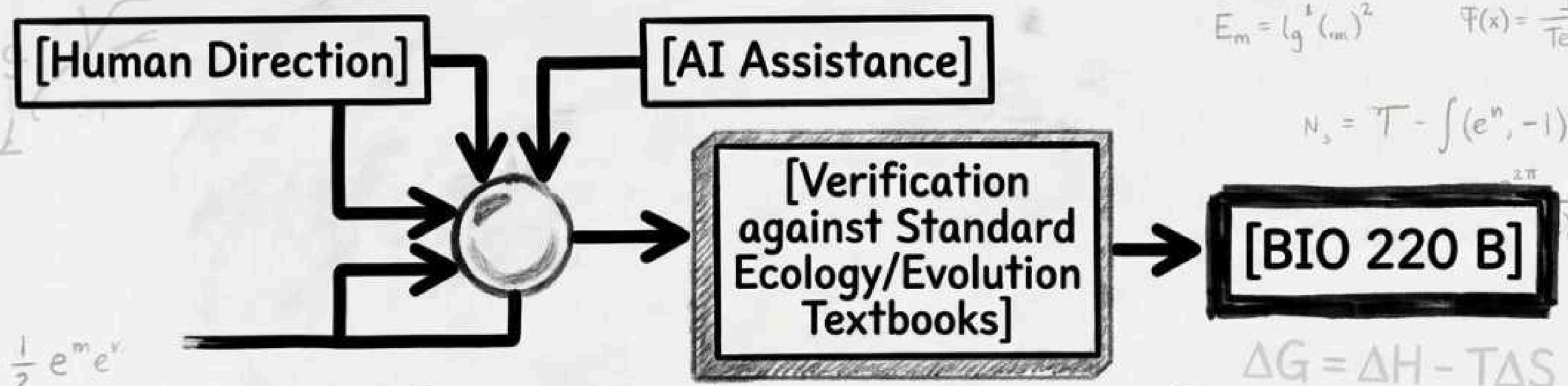
Information Processing Pipeline

¶ 0.8



Under the Hood

¶ 0.9



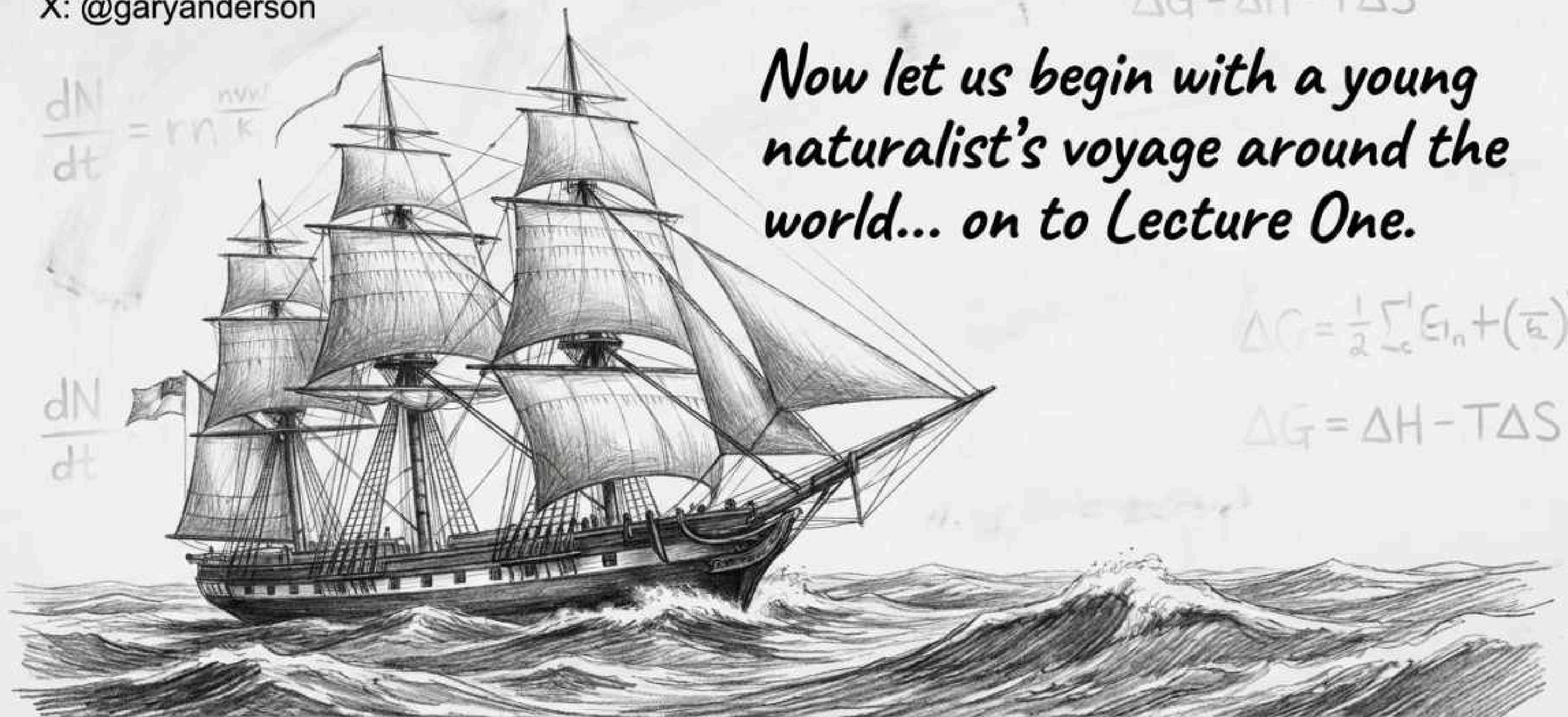
Dates in deep time are estimates.

$t \approx -4.5 \times 10^9$ yrs

Found an error? Report it using the exact ¶ Number.

Communications Hub
Questions or feedback:
garyanderson@mail.grokbot.com
X: @garyanderson

¶ 0.10



Now let us begin with a young naturalist's voyage around the world... on to Lecture One.