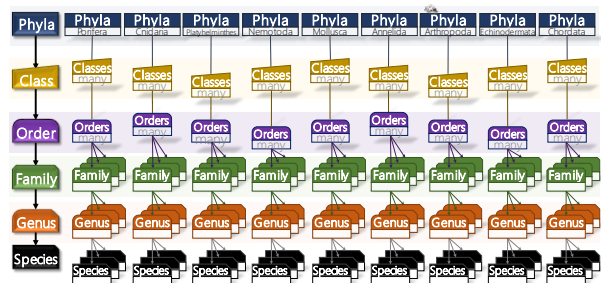
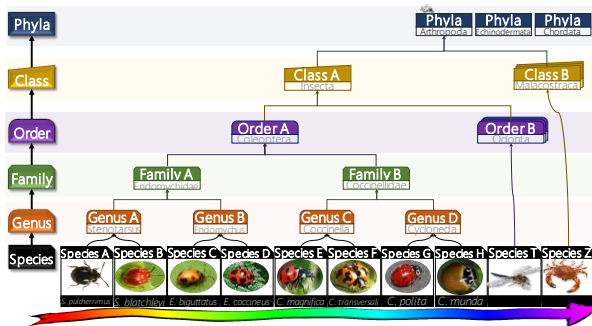
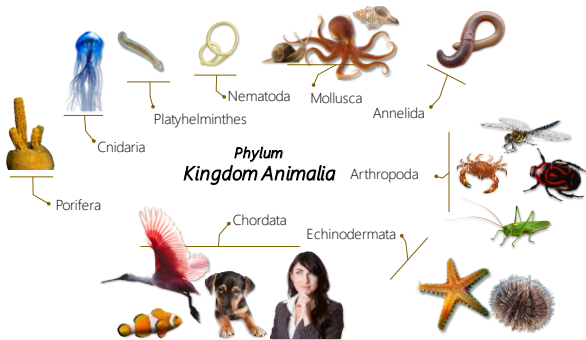
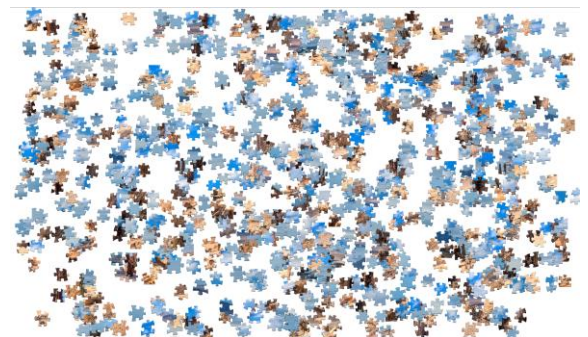
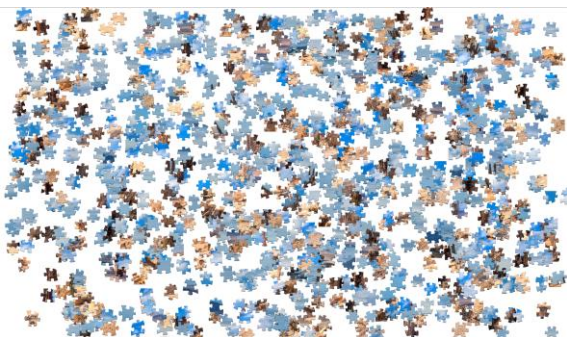
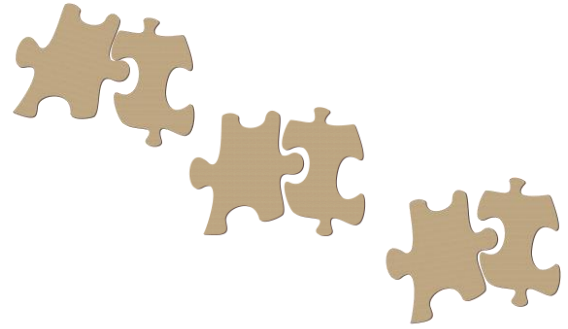
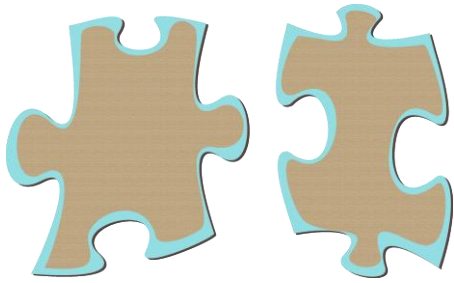
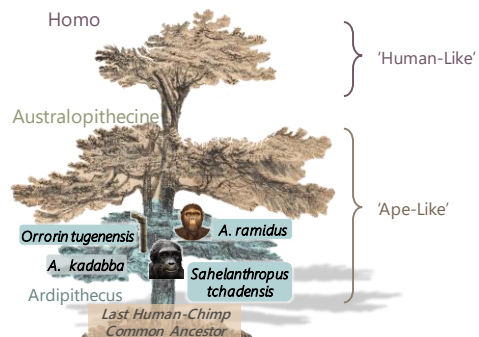
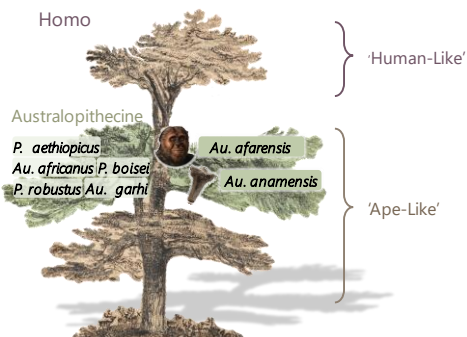
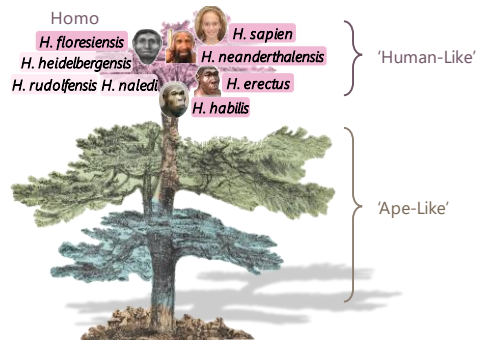
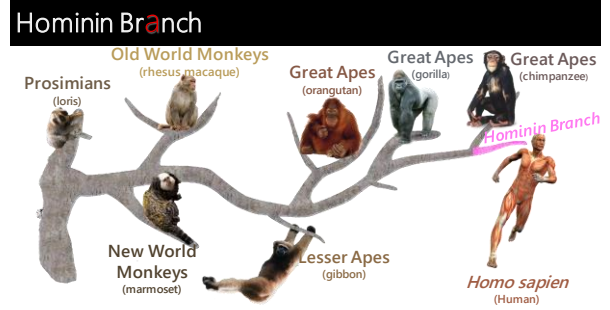
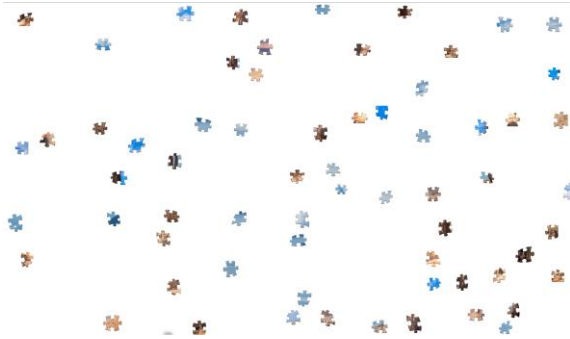


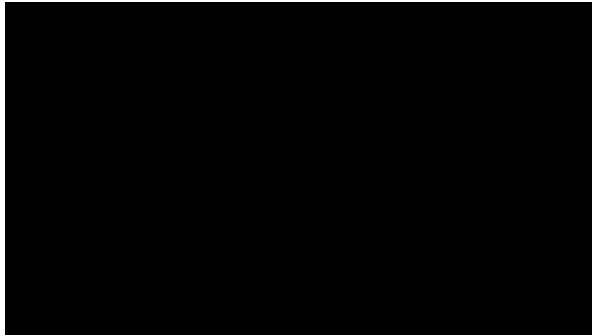
Tree Of Life









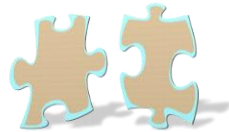


1. Fossil Record Fragmented



1. Fossil Record Fragmented

"you could put them all into a small shoe box and still have room for a good pair of shoes"
National Geographic 2015



"So 'fragmentary and disconnected' are the fossils that 'Despite the excited and optimistic claims... no fossil hominid species can be established as our direct ancestor'"
Richard Lewontin 1995

2. Fossils Not Complete



3. Field Is Fragmented

"Human evolutionary studies have been plagued by debate and controversy. Reasons for argument over a fragment of jaw, partial skull, handful of teeth ...are not that difficult to understand. Often a scrappy fossil generates diverse interpretations...stakes are high".

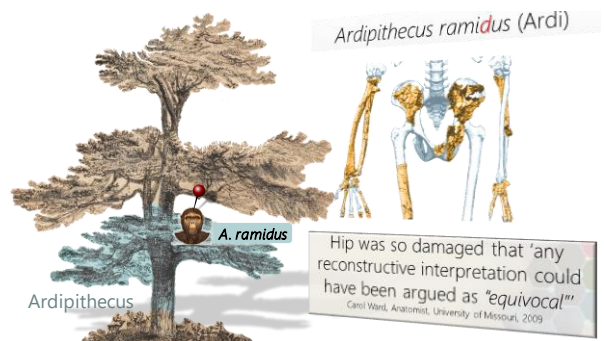
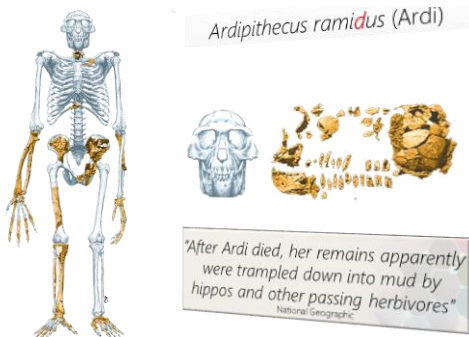
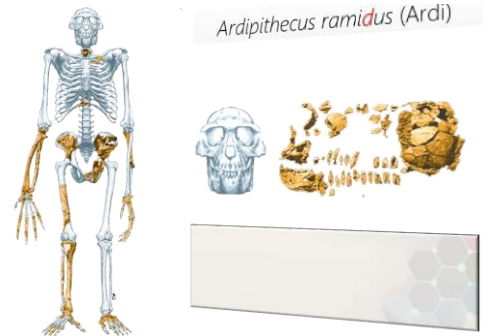
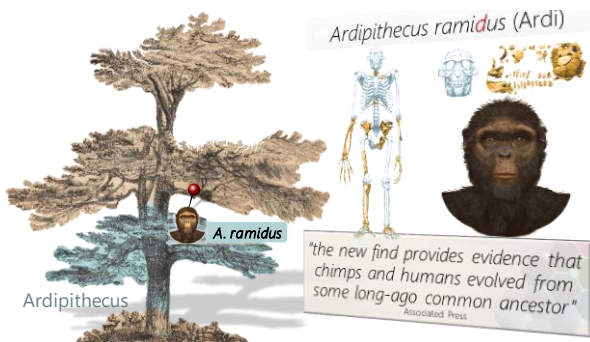
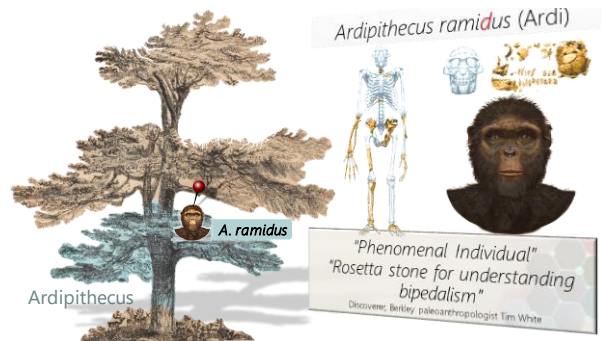
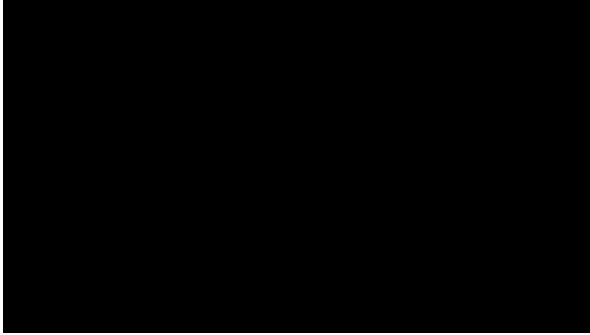
Blake Edgar, 2006

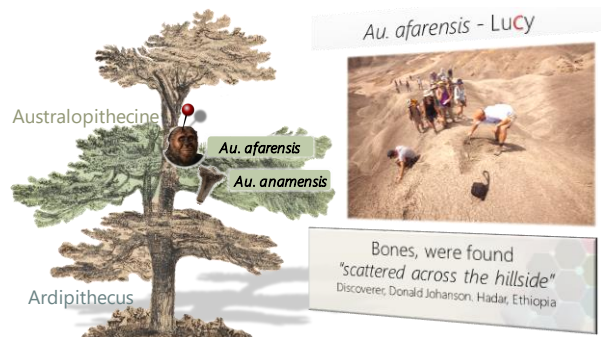
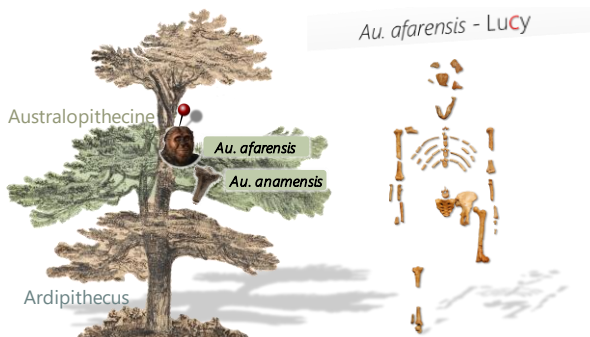
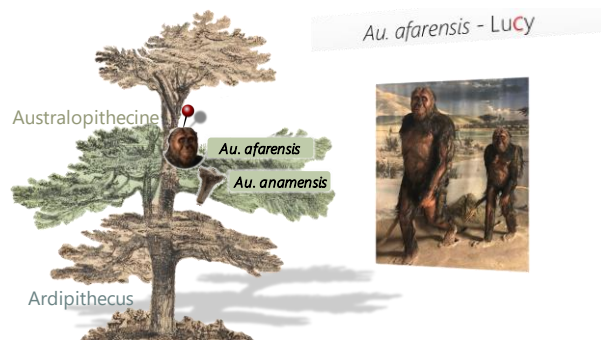
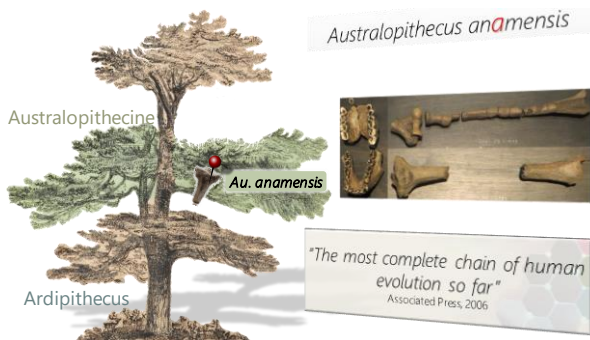
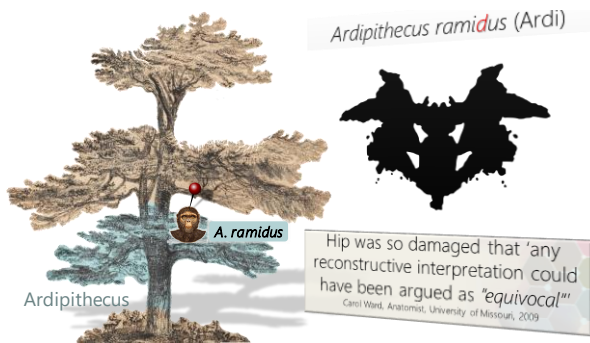


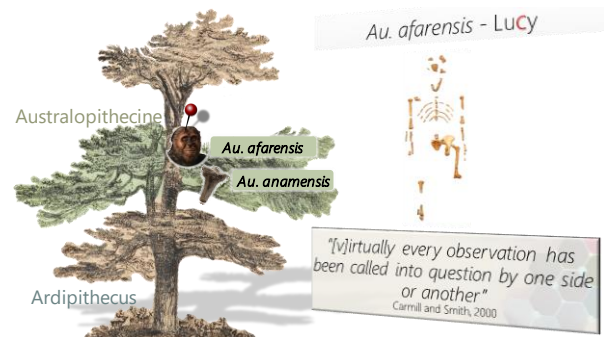
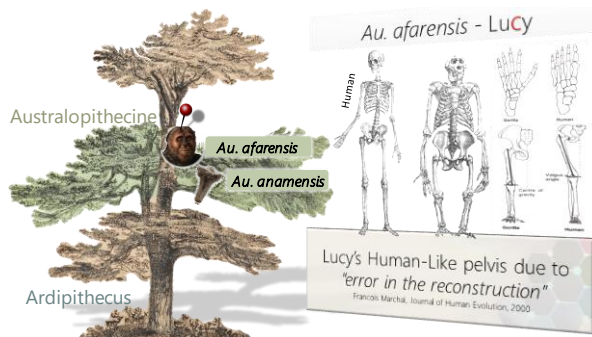
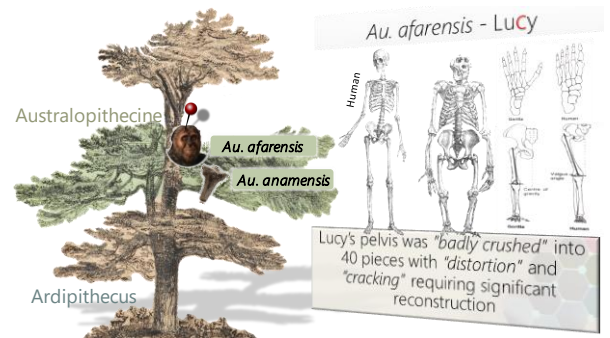
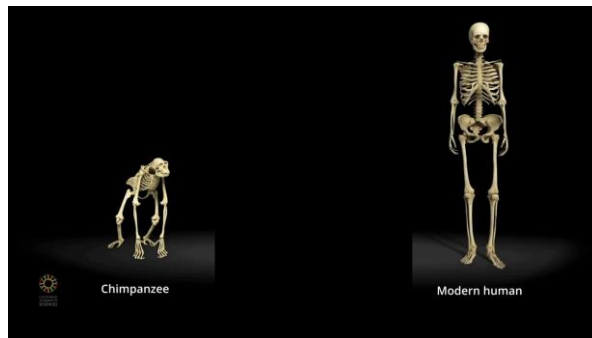
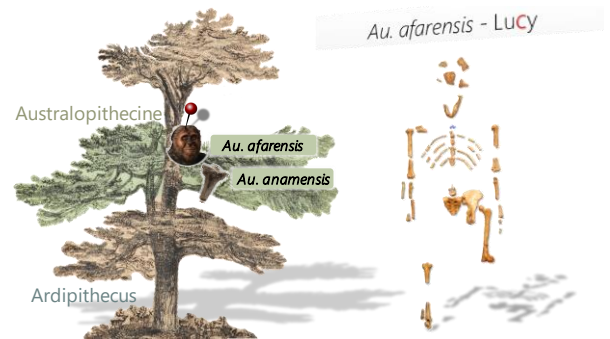
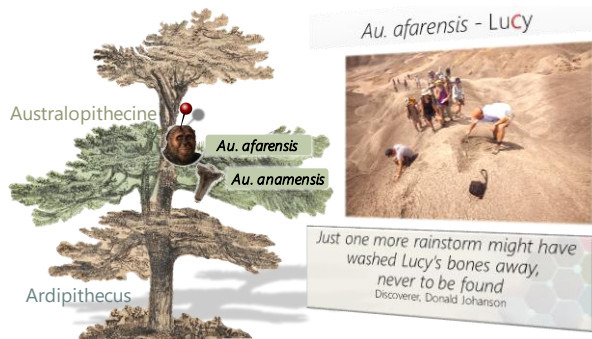
Personal Ambition

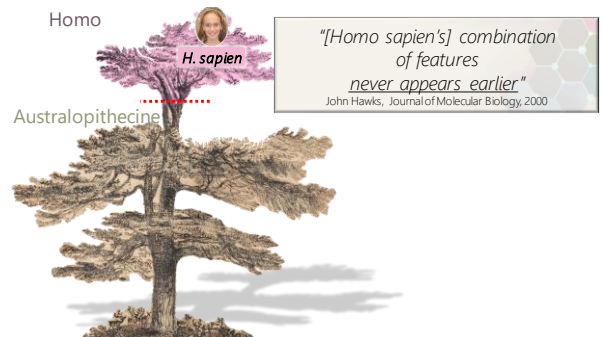
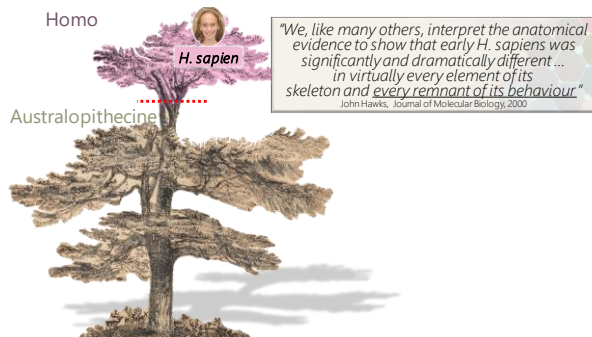
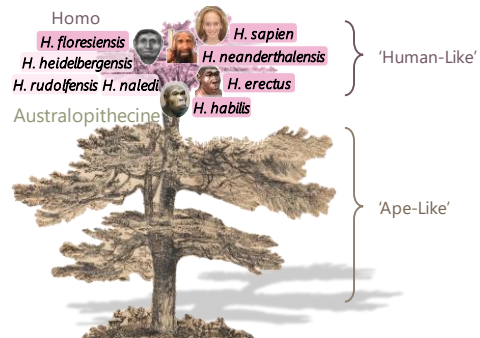
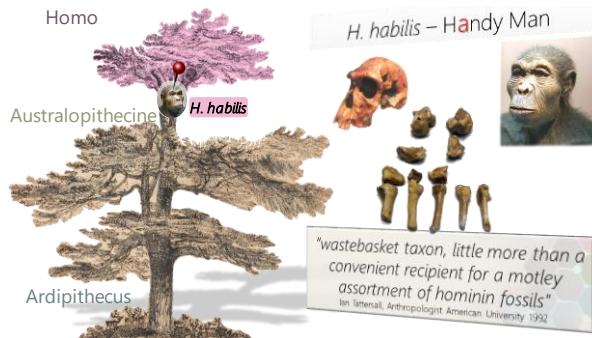
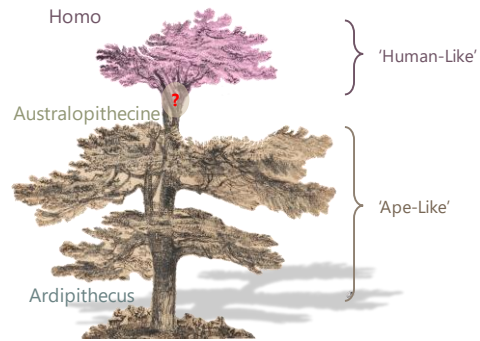
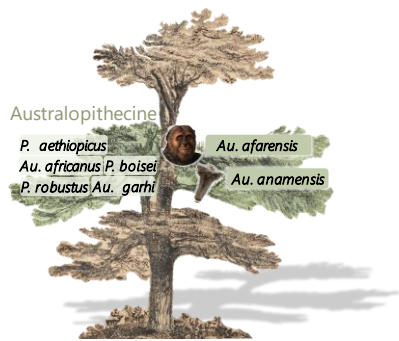
"...difficult to separate the personal from the scientific disputes raging in the field"

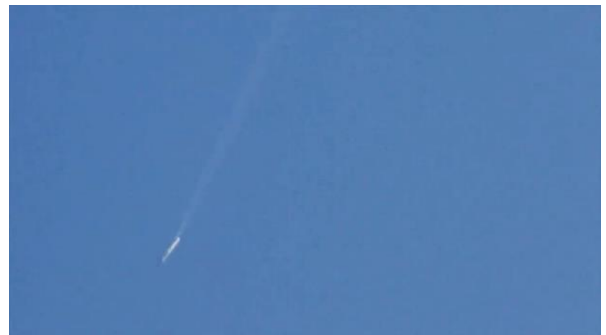
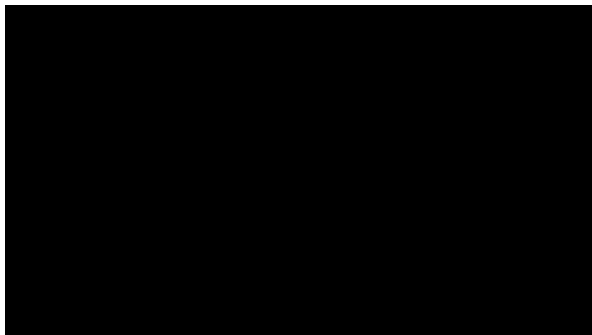
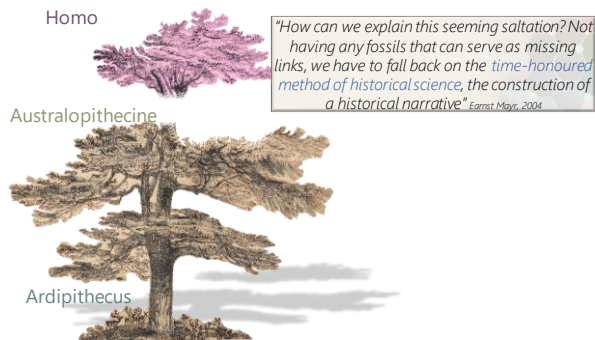
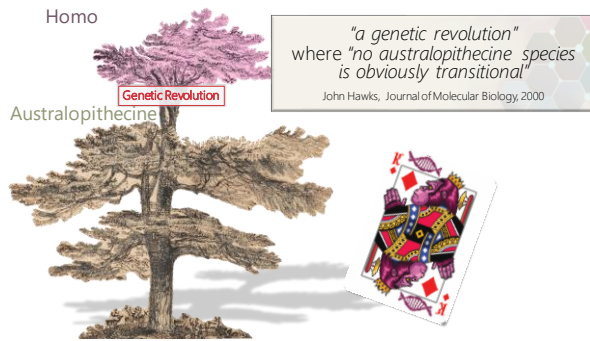
Constance Holden, Science 1981





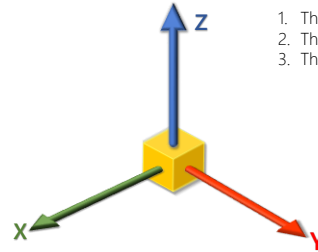






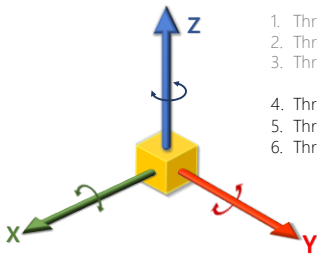


3D Linear Motion

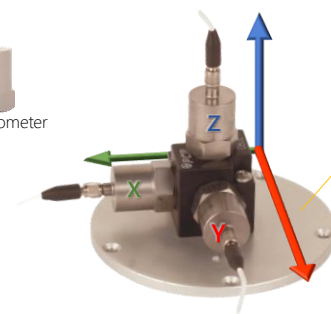


1. Three Positions: X, Y, Z
2. Three Velocities: X, Y, Z
3. Three Accelerations: X, Y, Z

3D Angular Motion



1. Three Positions: X, Y, Z
2. Three Velocities: X, Y, Z
3. Three Accelerations: X, Y, Z
4. Three Angular Positions: $\hat{X}, \hat{Y}, \hat{Z}$
5. Three Angular Velocities: $\dot{\hat{X}}, \dot{\hat{Y}}, \dot{\hat{Z}}$
6. Three Angular Accelerations: $\ddot{\hat{X}}, \ddot{\hat{Y}}, \ddot{\hat{Z}}$



Systems Control Theory

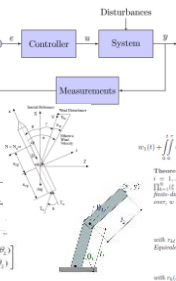
a_x = acceleration in x direction
 v_x = velocity in x direction
 s_x = position in x direction

$$v_x(t) = v_{x0} + \int_0^t a_x dt$$

$$s_x(t) = s_{x0} + \int_0^t v_x dt$$

$$\begin{bmatrix} \dot{x} \\ \dot{y} \end{bmatrix} = \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix} \begin{bmatrix} v_x \\ v_y \end{bmatrix}$$

$$\begin{bmatrix} \dot{x} \\ \dot{y} \end{bmatrix} = \begin{bmatrix} v_x \cos(\theta) - v_y \sin(\theta) \\ v_x \sin(\theta) + v_y \cos(\theta) \end{bmatrix}$$



$$\begin{bmatrix} \dot{x} \\ \dot{y} \end{bmatrix} = \begin{bmatrix} \cos(\theta) & -\sin(\theta) \\ \sin(\theta) & \cos(\theta) \end{bmatrix} \begin{bmatrix} v_x \\ v_y \end{bmatrix}$$

$$\begin{bmatrix} \dot{x} \\ \dot{y} \end{bmatrix} = \begin{bmatrix} v_x \cos(\theta) - v_y \sin(\theta) \\ v_x \sin(\theta) + v_y \cos(\theta) \end{bmatrix}$$

Homo



H. erectus – Upright Man

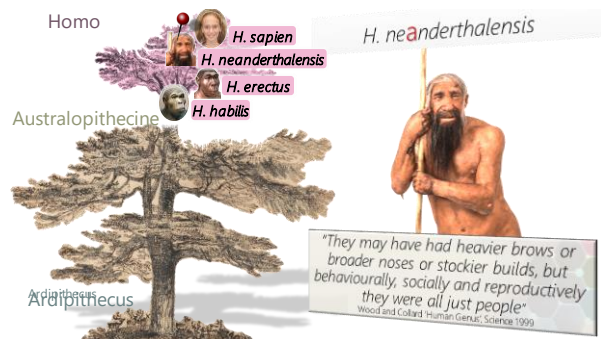
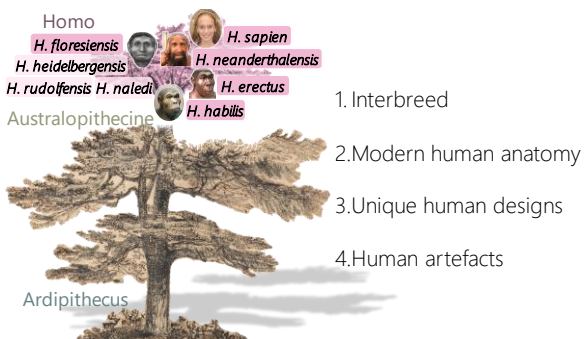
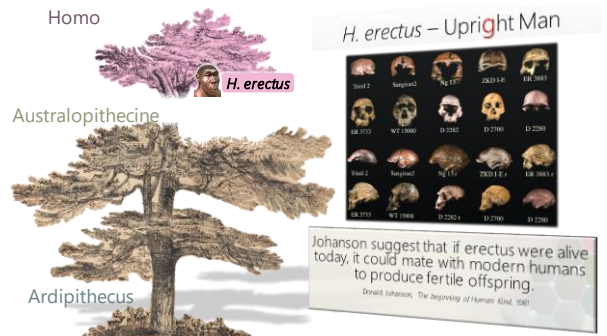
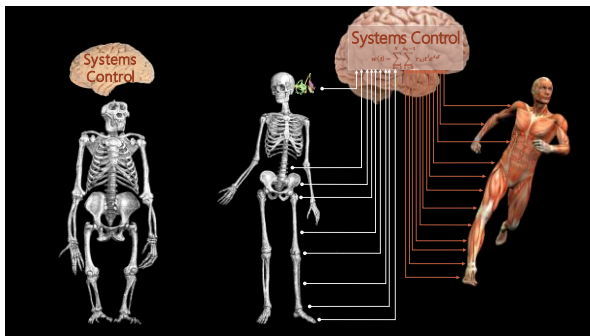
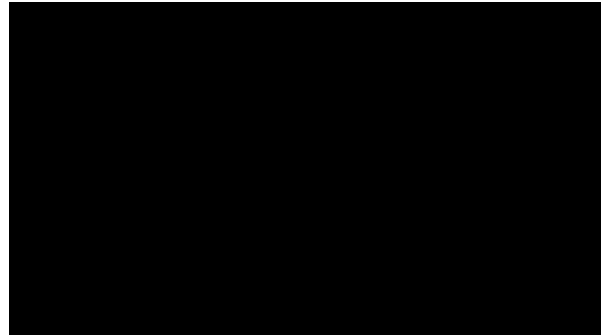
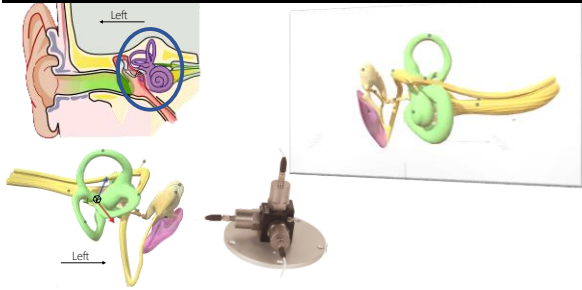
Australopithecine

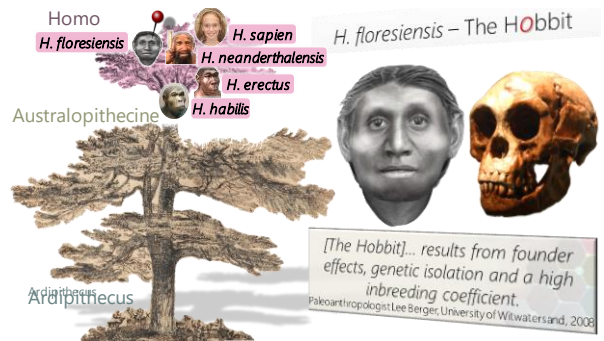
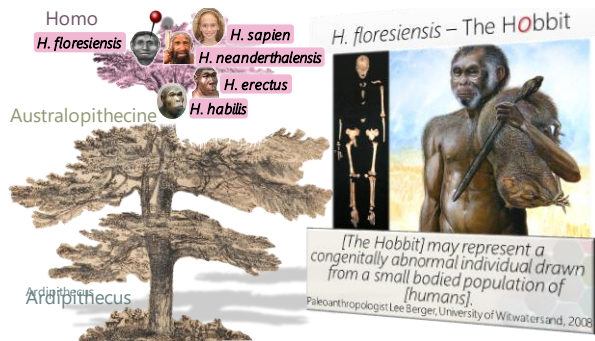


Ardipithecus

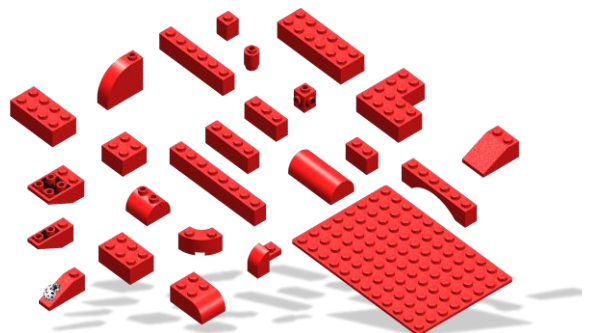
"Does *Homo erectus* exist as a true taxon, or should it be sunk into *Homo sapiens*?"
 Paleontologist Michael Day, University of London, 1986

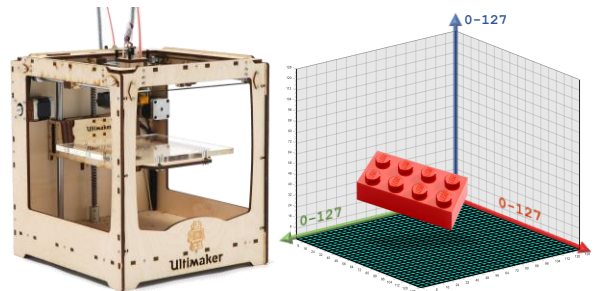
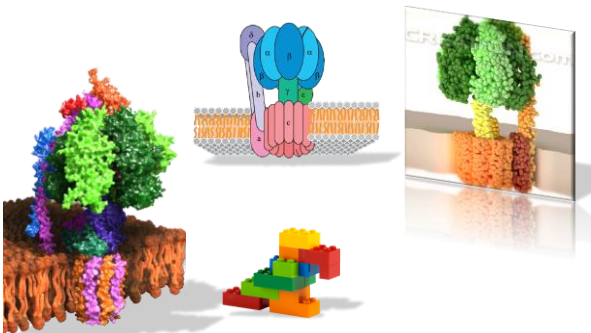
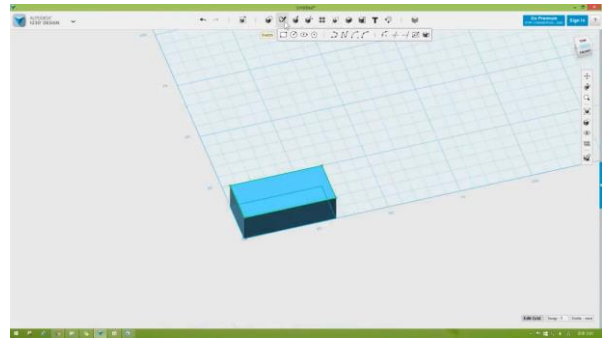
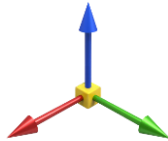
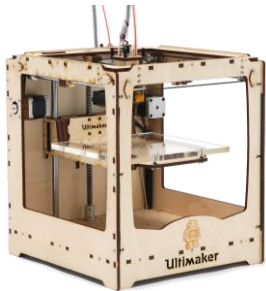
Human Semi-Circular Canals



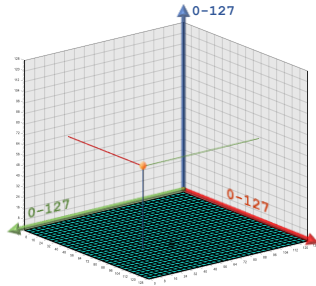


LEG GODT



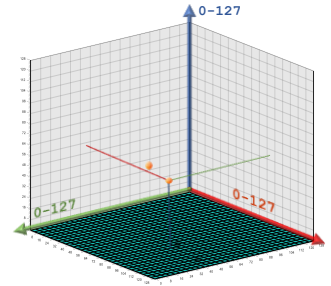


Step 1: Move head to coordinate
[34, 86, 62] Inject plastic



Step 1: Move head to coordinate
[34, 86, 62] Inject plastic

Step 2: Move head to coordinate
[44, 86, 54] Inject plastic

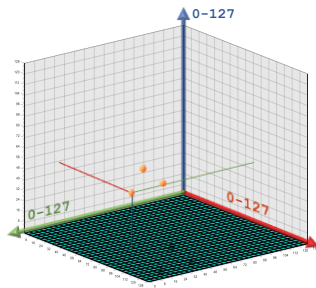


Step 1: Move head to coordinate
[34, 86, 62] Inject plastic

Step 2: Move head to coordinate
[44, 86, 54] Inject plastic

Step 3: Move head to coordinate
[26, 72, 46] inject plastic

Step 4 to Step 150:



Step 1: [26, 72, 46]

Step 2: [44, 86, 54]

Step 3: [26, 72, 46]

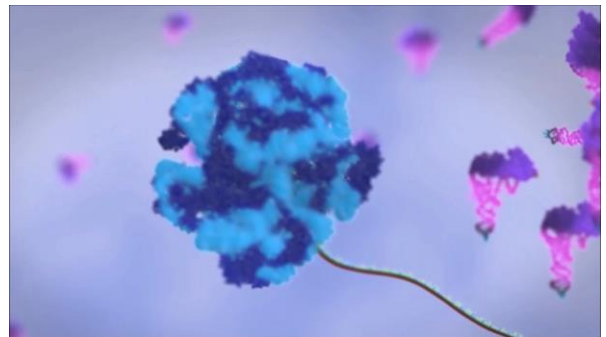
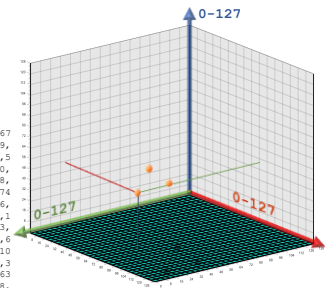
Step 4 to Step 150:

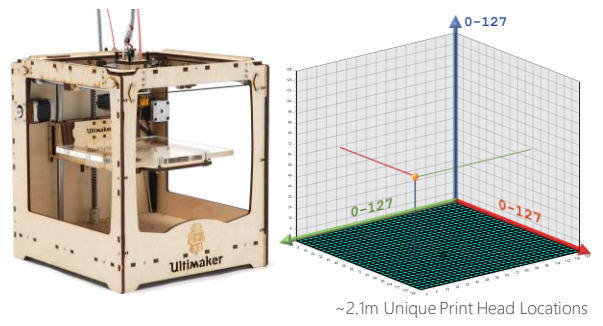
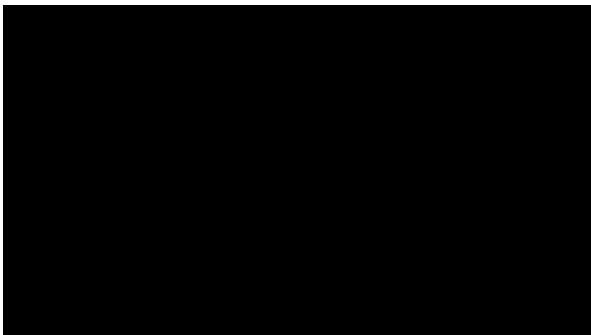
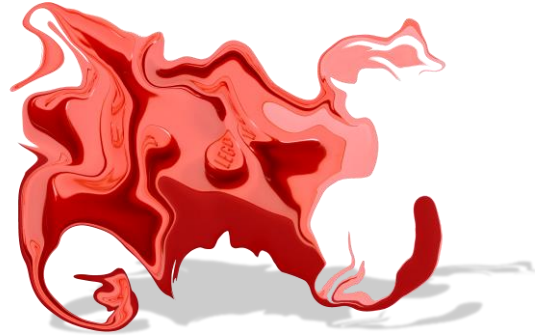
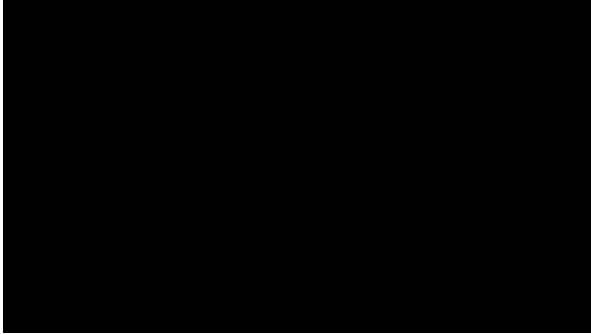
The full code looks like this...

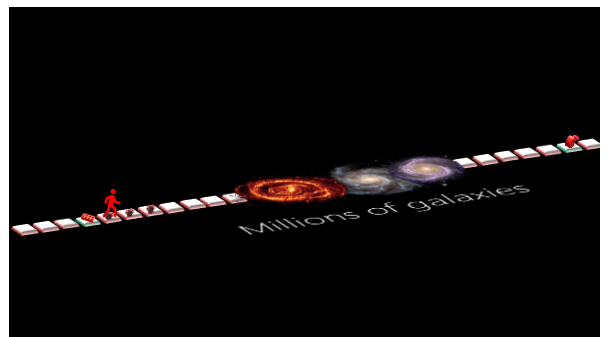
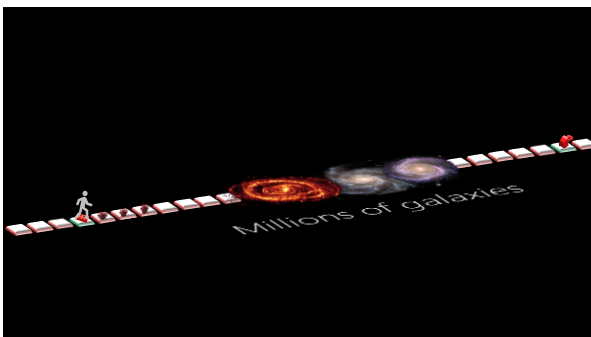
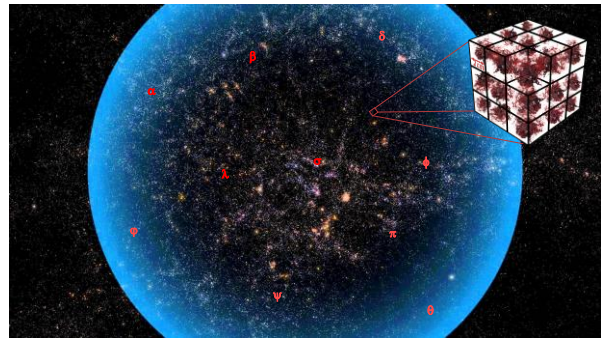
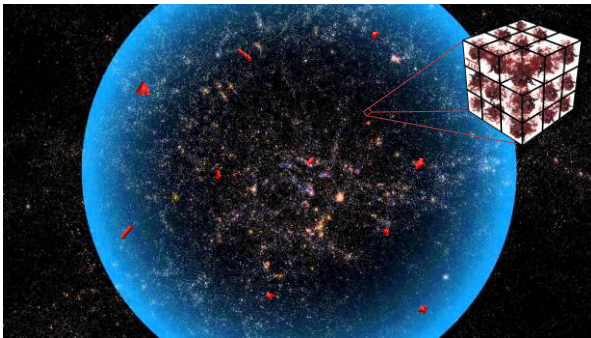
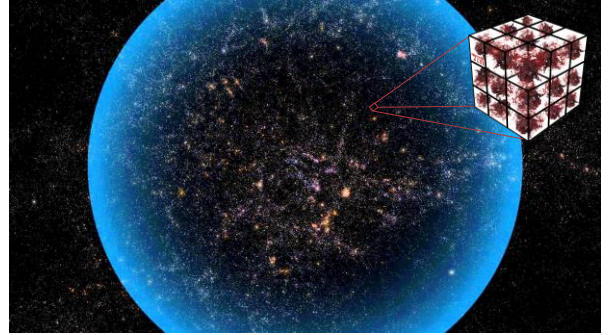
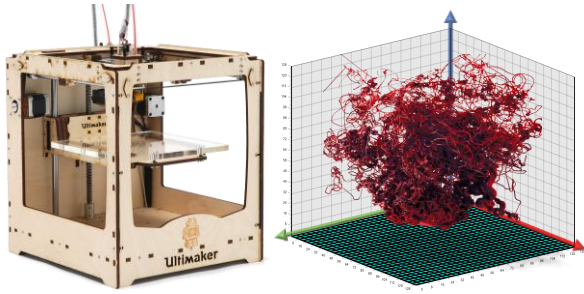
```

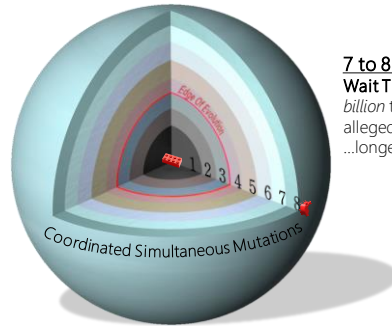
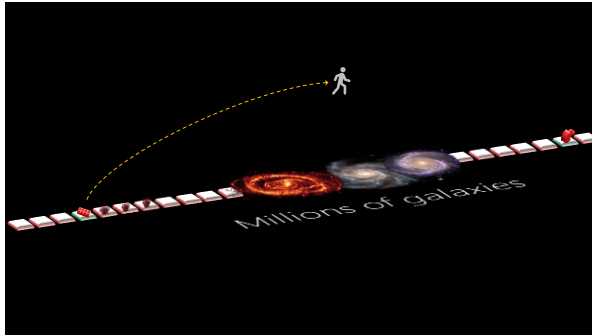
34, 86, 62, 44, 86, 54, 26, 72, 46, 24, 58, 69, 124, 41, 67
, 69, 20, 22, 22, 25, 98, 102, 18, 77, 114, 120, 110, 109,
1, 109, 122, 118, 91, 7, 11, 3, 97, 55, 15, 2, 88, 84, 75, 5
8, 13, 6, 39, 113, 125, 24, 26, 102, 7, 104, 83, 123, 120,
59, 34, 108, 113, 101, 23, 41, 114, 26, 125, 119, 95, 78,
90, 76, 17, 84, 34, 82, 69, 35, 18, 27, 13, 30, 14, 1, 0, 74
, 74, 103, 65, 69, 96, 18, 84, 4, 15, 39, 59, 109, 57, 116,
78, 9, 66, 67, 9, 79, 72, 64, 48, 32, 85, 10, 24, 21, 112, 1
19, 43, 105, 84, 44, 49, 81, 35, 87, 43, 68, 8, 35, 80, 43,
72, 56, 78, 1, 26, 39, 35, 123, 25, 15, 2, 96, 9, 11, 116, 6
8, 56, 35, 64, 37, 116, 88, 115, 56, 20, 18, 43, 65, 71, 10
7, 62, 42, 29, 45, 90, 118, 125, 79, 51, 115, 48, 26, 46, 3
6, 68, 47, 63, 38, 125, 80, 78, 126, 73, 92, 8, 42, 117, 63
, 56, 50, 65, 46, 119, 63, 112, 46, 42, 1, 58, 77, 112, 38,
66, 1, 110, 90, 110, 20, 59, 95, 102, 63, 56, 108, 122, 5,
85, 73, 1, 110, 99, 123, 105, 77, 29, 52, 95, 48, 109, ...

```









7 to 8 coordinated mutations

Wait Time: *one-hundred-million-billion* times longer than the alleged age of the universe. ...longer for primates.



Similarities

- Morphology
- Genetics: 95%

Similarity proves nothing (except similarity)

Similarities

- Morphology
- Genetics: 95%

Similarity proves nothing (except similarity)

Differences

- Novel Functions
- Pathways. Protein Space

Evolution must explain differences but:

- No Path
- No Time



