0 Mya - Cenozoic
Goodbye Big Dinosaurs  Mammals EXPLODE

Cretaceous
100 Mya -
First flowers
Bony fishes

Jurassic
200 Mya -
First Dinosaurs
Reptiles

Triassic
Permian

300 Mya - Carboniferous
Coal Forests
Pennsylvanian
Mississippian

Devonian
Silurian
First Forests
First life on land (insects start!)

400 Mya -
First land plants!
Jawed fishes

Ordovician
Jawless fishes

500 Mya -
Cambrian
Ocean life only

Let’s Explore Mammals but first a word from ELMER

© 2001 Brooks/Cole Publishing/TP
In geologic terms, higher life forms, in particular mammals and humans, have evolved only very recently.

Humans have existed for only ~ 3 million years.

Modern for about 100,000 years to 200,000 years
Eggs, Scales
Ectoderms

Note: Dinosaurs from
Reptiles - Endoderms - feathers

Endoderms - fur, no scales
Two major families
One of the Earliest Mammals: Tricondon; an egg-laying mammal
Existed during dinosaur era

Two families developed
1. Egg-laying (today only the Platypus & Spiny Anteater left)
   included a herbivore group—gone now!
2. Marsupial & Placental
   Both well represented in the Late Cretaceous
Marsupials: pouched mammals, live birth very early, placenta breaks down very early! young animal, helpless embryo, climbs from the mother's birth canal to the nipples in pouch. grabs with its mouth (gets milk) and continues to develop and Hang out in pouch

Mostly in Australia
Opossum is in U.S.
Placental mammals 4000 described species, mostly rodents and bats. Include whales, elephants, shrews, armadillos, dogs, pigs, sheep, cattle, horses, most furry animals we know. And humans! Live young, nourished before birth in the mother's uterus through a specialized embryonic organ attached to the uterus wall, the placenta. (derived from the same membranes that surround the embryos in the amniote eggs of reptiles, birds,) Placenta mammal is a “misnomer” Marsupials have very short-lived placenta! Most Babies mature relatively fast except HUMANS WHY????
Late Cretaceous mammals whose off-springs Survived the Mass Extinction at K-T Boundary

Oldest placental mammals were “Insectivoras”: Like shrews, moles and hedgehogs of today.
Post Mass Extinction at the Cretaceous-Tertiary Boundary

We leave the Mesozoic Era and enter the Cenozoic Era: with Tertiary and Quarternary Epochs:

Each divided into periods!

NOTE: CONIFERS

Early Tertiary (Paleocene period) 58 to 65 M.Y.A.: mammal holdovers

Most “orders” replaced by rapid diversification and thus went extinct
The Eocene: Next period of Tertiary
Most modern orders existed.
(38 to 55 M.Y.A.)

The first Giant Mammals

Ancestor of the horse!
More orders in the Eocene: Note: lush subtropical environment:
1-Giant mammal, 2-carnivore  3-early horse  4-tapirs  5-early “rhino”
More orders in the Eocene:
1- herbivore  2- sabertooth catlike  3- early horse  4 pig-like (large!)
5- rhinoceros  6- small deerlike
In new cenozoic era
Modern Birds orders
Started in early tertiary.
Orders such as
Owls, hawks, ducks,
Penguins & vultures began
Large flightless birds started.
“Diatryma” to 6 ft. These
Were the major predators
Until mammal carnivores
took over.
The order vanished in
S. America only 2.5 M.Y.A.
“Moas”(3 meters. N.Z.) and
“Elephant Birds” (to 1 ton.
Madagascar) tasted too good
Humans ate them to
extinction!
Next to last period the Miocene (4 to 20 M.Y.A.) of Tertiary epoch
In the Cenozoic era. Ancestors of modern orders seen here.

Camels

Rhino’s

Pronghorn

Horses
End of Tertiary in the Pliocene period Only 2.5 to 5 M. Y. A.
Most mammals resemble today’s

Shovel tusked Mastedon
Rhinos
Horned Hoofed
Snout horned hoofed
Cute but went extinct
Easter bunny!
“Los Angeles” The new Quaternary Era near end of Pleistocene Period (10,000 Y.A.) “Dinner is served” La Brea Tar pits

Giant Vultures

Mammoth Herd

Many large mammals went extinct! Why?

Saber toothed cat

Giant ground Sloth

Mural by Charles R. Knight
Evolution at it’s best!
The Horse (EQUUS)
TRENDS
1. Size increase
2. Longer legs and feet
3. Vestige lateral toes
4. Back straightens
5. Lot of teeth changes for grinding
6. Larger brain
HUMAN EVOLUTION

HOW DID OUR ANCESTORS ORIGinate?
Current research has clarified the details on recent human migration and general trends in our evolution. Classification is first job of biologist. Where are Humans?

**ORDER:** Primate

**SUB ORDERS:** Prosimians

- Tarsiers
- Lemurs

**SUPERFAMILIES**

1. New World Monkeys
2. Baboons Old world Monkeys
3. Apes Humans
Suborder: Prosimians
Ring-tailed Lemur

Tarsier
Hi. Got a quarter? 

I’m in Suporder Anthropoid in Superfamily 1
A new world Monkey
What's happen Man!

I'm an Anthropoid in Superfamily 2: They call me a Baboon.
Hey bud! What’s ya Problem?

I’m an Anthropoid in Superfamily 3: also an ape called a Gorilla!
Hmmm! You look intelligent!

My DNA and Your DNA is about 93% the same.

I’m an Anthropoid in Superfamily 3: an ape called a Chimpanzee.
Proconsul: very early Superfamily 3! Miocene period 10-20 M.Y.A.
Hominids family include humans and ancestors:

Features are:
Note: Ischium
Reduced face, Reduced canine teeth

Omnivorous, Increased dexterity, sophisticated tools

(a) Gorilla
(b) Human
Oldest 4.4 M. Y. A. place in history not sure.

Common Hominids
In geologic history
OLDER PRE DNA IDEAS

© 2001 Brooks/Cole Publishing/ITP
Modern DNA based Concepts on origin Of Homo Sapiens November 2009

Note: Broad strokes
Australopithecus
H. Erectus
H. Heidelbergensis
H. Neanderthalensis
H. Sapiens (YOU!)
“LUCY”
3.5 M. Y. A. (Pliocene epoch)
AUSTRALOPITHECUS AFARENSIS

NOTE FULL BIPEDAL MOTION.
Pliocene: 3 M.Y.A.
Lucy’s family?

Height: 1 to 1.5 m
Weight 29 to 45 kg
Brain vol: 380-450cc
Note: chimps 300-400cc
Humans today: 1350cc
Homo Erectus evolved in Africa 1.8 M.Y.A. Migrated to Europe and Asia By 1.0 M. Y.A. was distributed throughout Asia Survived until 100,000 y.a. Height 1.6 to 1.8 M Weight 53 to 63 kg Brain 800 to 1300 cc

NOTE: FIRE & TOOLS
These gave rise to H. Heidelbergensis From which H. Neanderthalensis Developed in Europe And H. Sapiens developed in Africa

HUMAN GENOGRAPHIC PROJECT

HOMO ERECTUS
H. Heidelbergensis
in Europe and Africa
Neanderthals arose from \textit{H. Heidelbergensis} in Europe. Their brains were slightly larger than ours. Buried with flowers and survived cold climates. Evolved about 200,000 Y.A. Probably no trace of their DNA in Modern Humans.
Early Homo sapiens became us and current trends are cultural not biological! We have gone from a stone culture to sending spacecraft to other planets in a very short time ...where are we going?

How do you tell if you have different species ...let's consider The MULE! >>>> Ditto for Neanderthal/Homo Sapiens
EXAMPLE: Cro-Magnon (European *early modern humans*) the artists

30,000 Y.A. Replaced Neanderthals in Europe.
Homo Sapiens Evolved in Africa and spread around the world
Creation Science Vs Science
A major problem in America

General Debate and history
Warning some nude images in famous painting!

Anderson cooper debate..
Evolution vs Creationism Scientist speak out

Is this our future?
Ali G and science and Creation…part view