Chapter Six the Primate order
Quiz concerns

Evolution: change in allele frequencies from generation to generation

Modern synthetic theory explains evolution as occurring in two stages:

First stage: microevo processes = mutation, recombination, genetic drift, and gene flow produce and redistribute genetic variation
  Genetic drift: evolution due to chance
  Gene flow: evolution due to gene exchange between populations

Second stage: macroevo processes like natural selection act on variation over geologic time causing speciation
Mammalian homologies

- Endothermic

- Heterodont dentition

- Placental

- Complex brains and flexible behavior
Overview of the primates

-native to tropics and semi-tropics
Overview of the primates

**Four categories** of Primate homologies

1. Limbs and locomotion
2. Diet and dentition
3. Senses and brain
4. Maturity and behavior

Rhesus macaque
Summary Chapter 6 main points

Where: Africa, Southeast Asia, South and Central America

Traits distinguishing primates from mammals:
- larger bodies and brain
- have generalized dentition (omnivorous)
- rely on vision more than smell (arboreal, diurnal, prehensility)
- longer developmental periods

- primate traits most likely adaptations to an arboreal lifestyle
Overview of the primates

1. Limbs and locomotion
   - flexible limbs
   - prehensile hands/feet
   - nails and opposable thumbs
2. Diet and dentition
- generalized dentition
- leads to omnivorous

Dental formulas:

(a) Human: 2.1.2.3.
(b) New World monkey: 2.1.3.3.
3. Senses and brain

Increased reliance on vision
  - color vision
  - diurnal

Stereoscopic vision
  - front-facing eyes
4. Maturity and behavior

Maturity
- longer gestation period
- delayed maturation
- few offspring

Behavior
- increased parental care
- depend more on learned, flexible social behavior
Explaining primate traits

Arboreal hypothesis: traits are adaptations to living in trees

Visual-predation hypothesis: many primate traits are adaptations to hunting insects in the lower tiers of the rainforests mya.

Flowering plant hypothesis: primate traits developed the same time flowering plants (angiosperms) diversified globally.
Survey of living primates

Where: Lemurs (Madagascar) and lorises (India)
Diet: range: vegetables to insects (lemurs) insectivores (lorises)

Traits: retention of many ancestral traits
- reliance on smell (long snout + rhinarium)
- dental comb
- shorter gestation/maturation

Larger lemurs: diurnal
Smaller lemurs: nocturnal
Tarsiers

Where: Southeast Asian islands
Diet: insectivores

Traits
- nocturnal (ancestral)
- specialized to owl niche (ancestral)
- forward facing eyes (derived)
- lack rhinarium
Anthropoids
monkeys, apes, humans

Traits shared by all anthropoids
Compared to the prosimians...

- increase in complex social behavior
- increased parental care
- more mutual grooming
Monkeys

-85% of all primate species

Geographically divided groups:
New World monkeys and Old World monkeys
New World Monkeys

Where: Central and South America
- almost exclusively arboreal
- prehensile tail
New World Monkeys (example)

Capuchin monkeys

Where: throughout Central America
Diet: frugivorous

-capuchins, chimpanzees, and humans use stone tools
New World Monkeys (example)

Tamarins and marmosets
- smallest monkeys
- twin births
- males more involved in infant care
Old World Monkeys (Cercopithecidae)

Where: Africa to Southeast Asian islands
- sexual dimorphism
- females have swelling and redness during estrus
Old World Monkeys subfamilies

Where: Africa to Southeast Asian islands

Cercopithecines (baboons and macaques)
- terrestrial baboons have ischial callosities
Old World Monkey (example)

Colobines (colobus monkeys)

Where: Africa

Diet: folivorous

-segmented stomachs efficiently digest leaves
Hominoids: apes and humans

Traits distinguishing them from monkeys
- larger body size
- shortened trunk
- arms longer than legs
- terrestrial
- no tail
- more complex brains and behavior
- longer infant developmental periods
Gibbons and siamangs

Where: tropics of southeast Asia
Diet: omnivorous

Traits:
- adaptations to **brachiation**: arm-swinging suspensory locomotion
  - muscled shoulders
  - long arms
  - curved fingers
Orangutans

Where: Borneo and Sumatran forests
Diet: frugivorous

Traits
- almost completely arboreal
- solitary
Gorillas

Where: Africa (east/west lowland, and mountains)
Diet: vegetarians

Traits

- largest living primates
- sexual dimorphism
Chimpanzee

Where: equatorial Africa
Diet: omnivorous plus other animals

Traits
- knuckle-walk and brachiate
- large fluid communities
- form lifelong attachments
- use tools and hunt animals
Bonobos
Where: areas south of Zaire River
Diet: omnivorous

Traits
- copulate throughout estrus cycle
- female-centered communities
- female-female and male-male sexual behaviors
**Homo sapiens**

**Where:** found everywhere in all climates

**Diet:** omnivorous

**Traits**

- only living bipeds
- brainsize increased enormously
- entirely dependent on culture