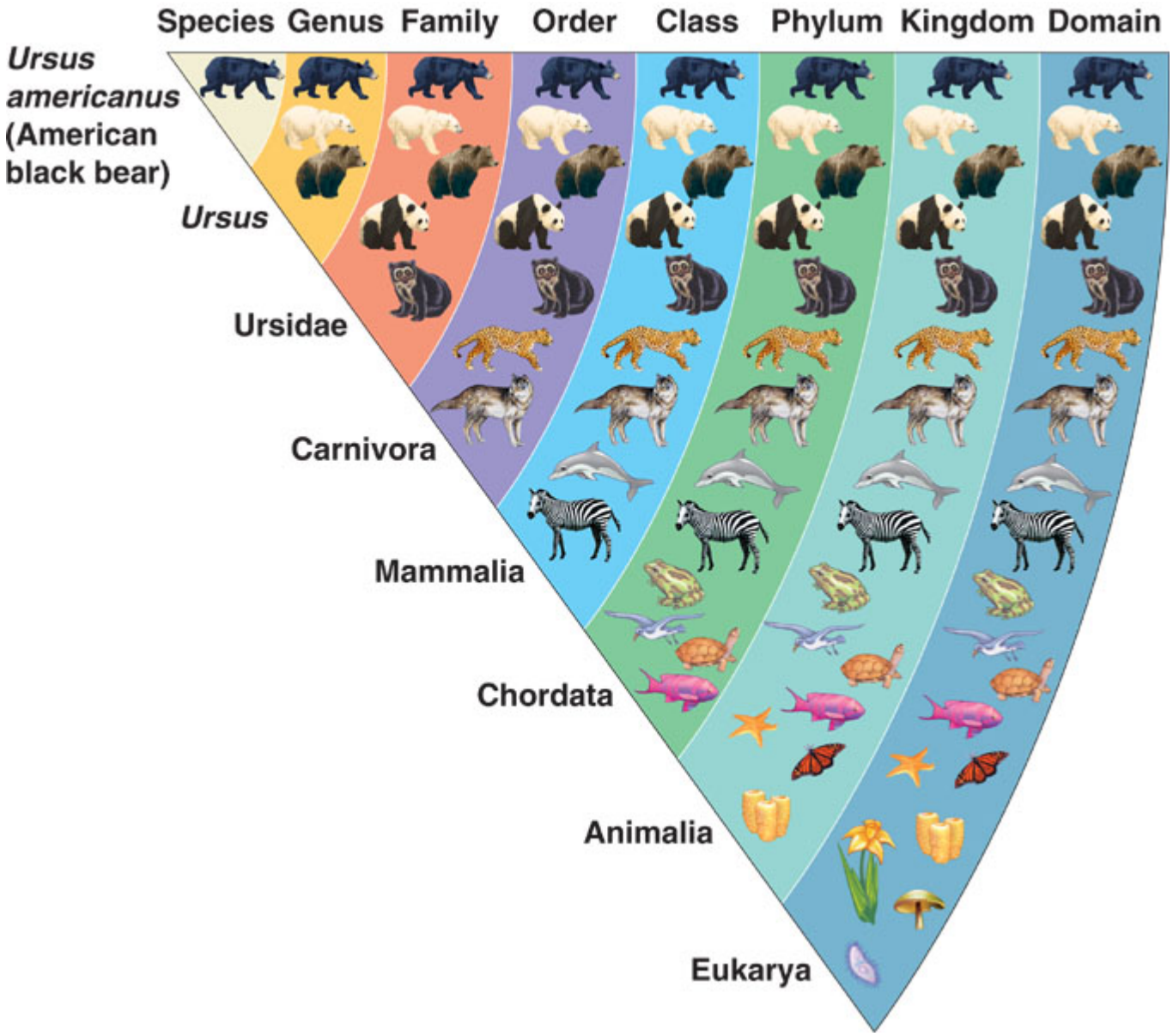

# Exam Review

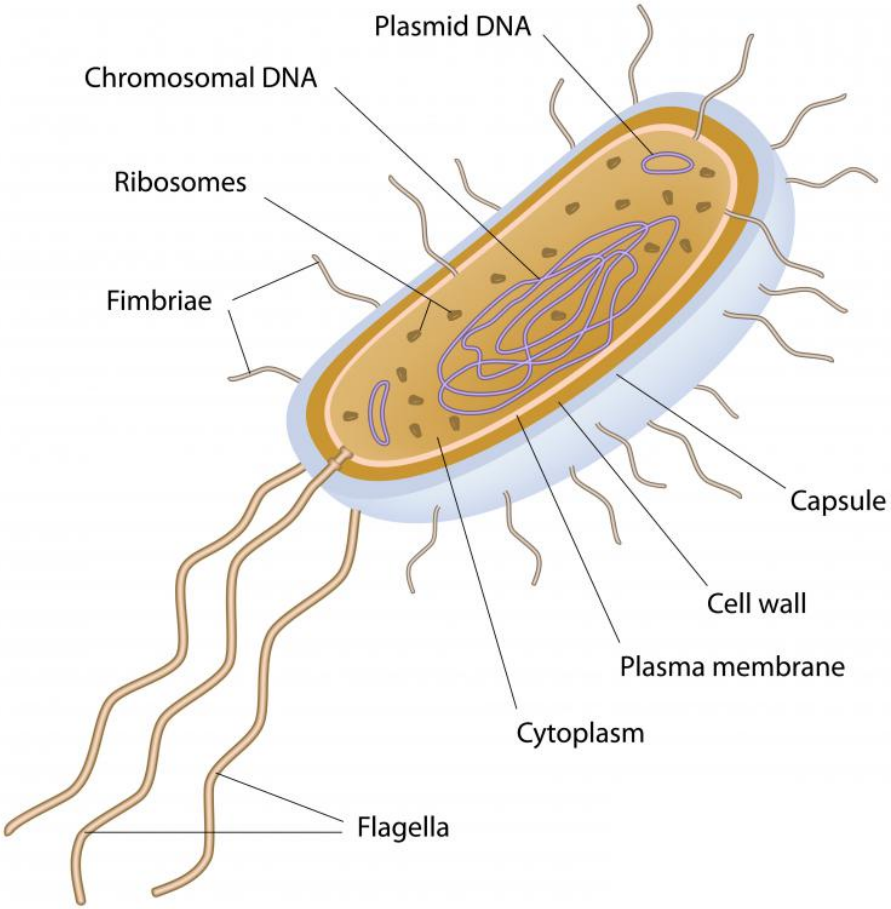
# Levels of classification (kingdom system of classification)

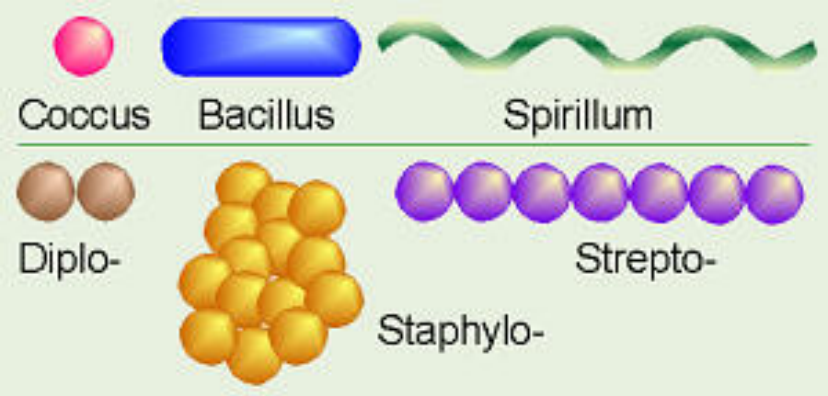


# Match each characteristic to the correct kingdom.

| Domain | Bacteria | Archaea | Eukarya |
|---|---|---|---|
| Kingdom | | | |
| Example | | | |
| Cell type | | | |
| Cell walls | | | |
| Number of cells | | | |
| Nutrition | | | |

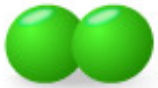
# Prokaryotes; characteristics of bacteria (shapes, structure)



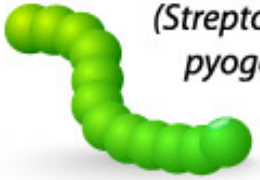



# BACTERIA SHAPES

## SPHERES (COCCI)

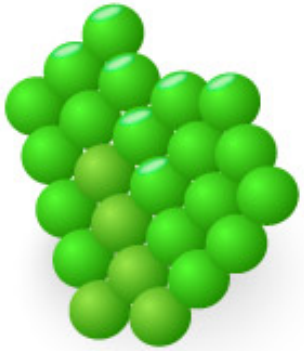


***Diplococci***
*(Streptococcus pneumoniae)*



***Streptococci***
*(Streptococcus pyogenes)*

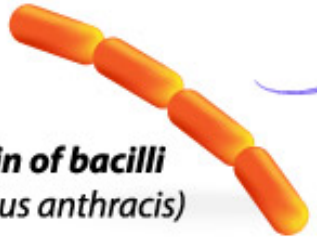
***Tetrad***



***Staphylococci***
*(Staphylococcus aureus)*

***Sarcina***
*(Sarcina ventriculi)*

## RODS (BACILLI)



***Chain of bacilli***
*(Bacillus anthracis)*

***Flagellate rods***
*(Salmonella typhi)*

***Spore-former***
*(Clostridium botulinum)*

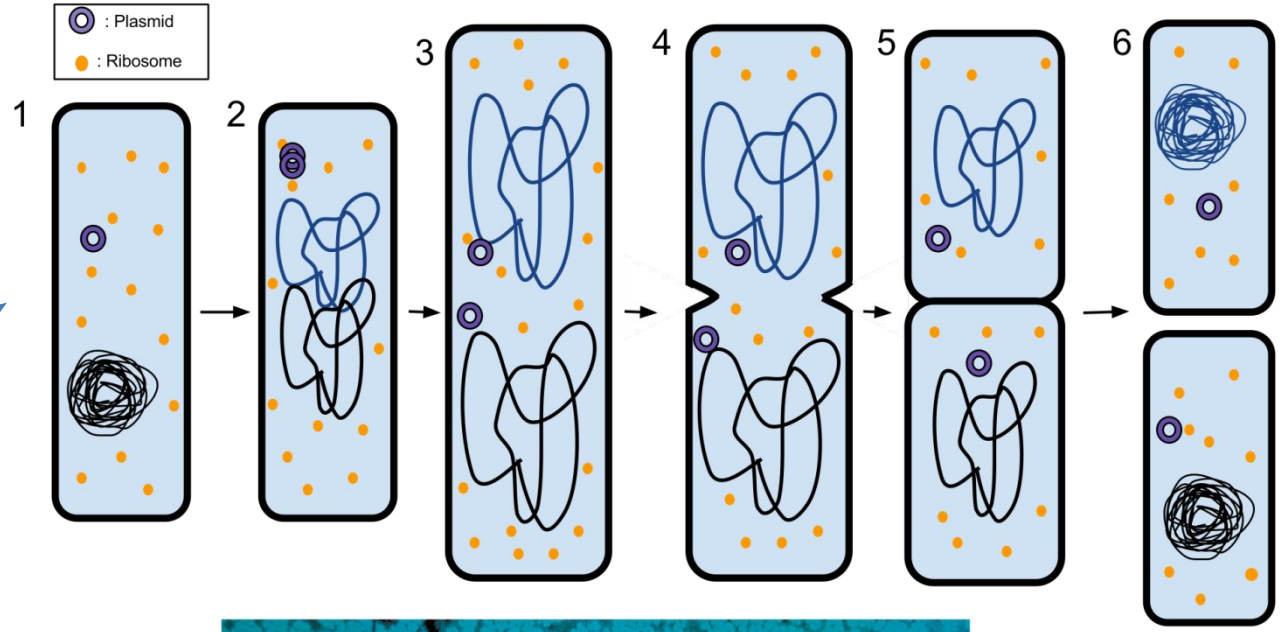
## SPIRALS

***Vibrios***
*(Vibrio cholerae)*

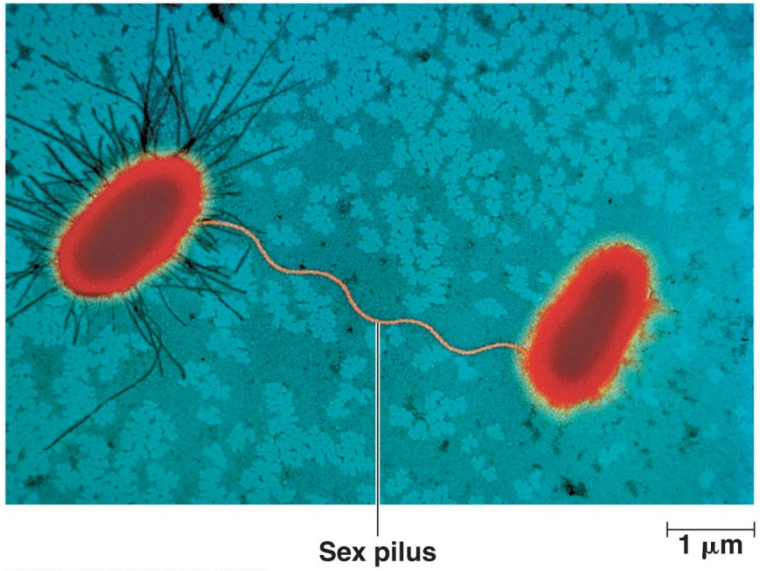
***Spirilla***
*(Helicobacter pylori)*

***Spirochaetes***
*(Treponema pallidum)*

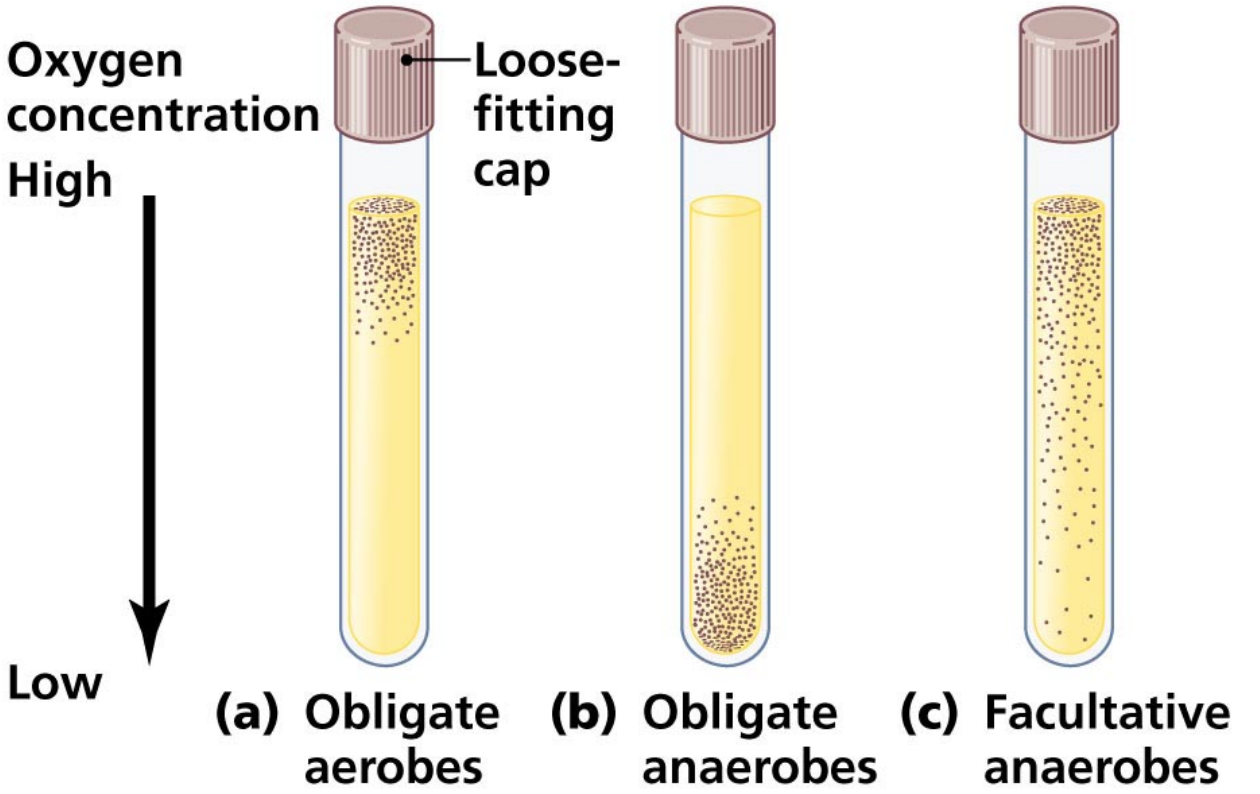
# reproduction



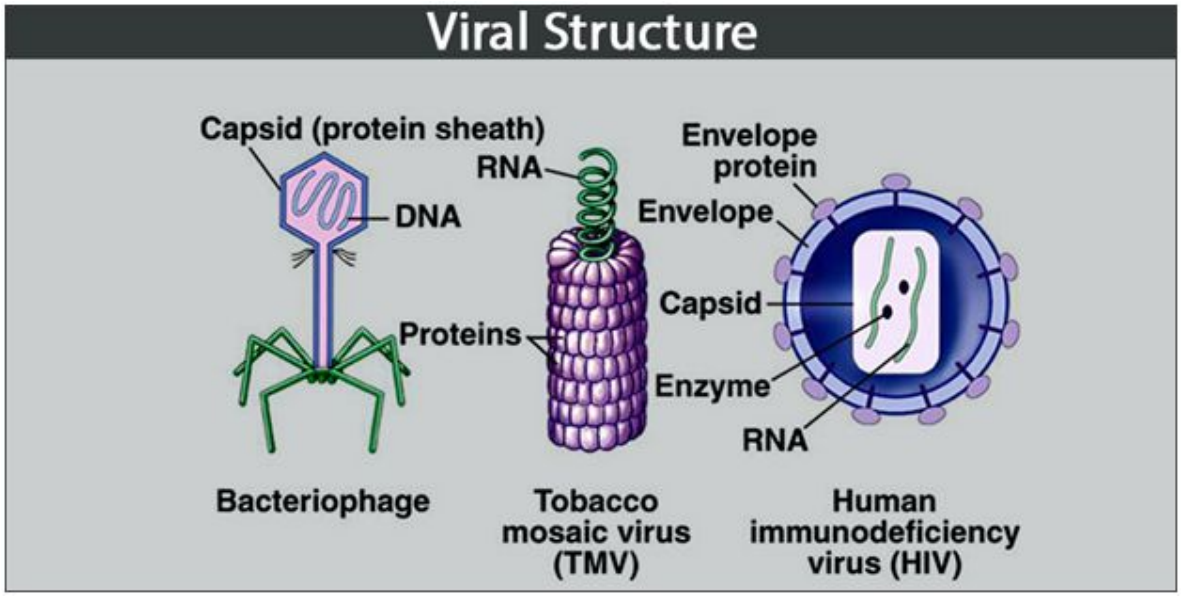

What is this process called?

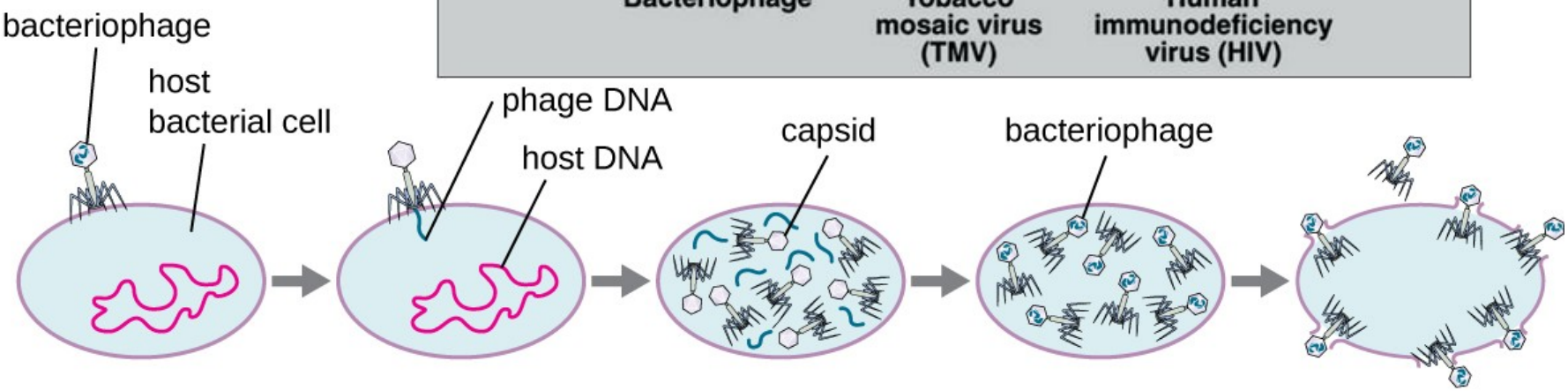


# aerobe/anaerobe



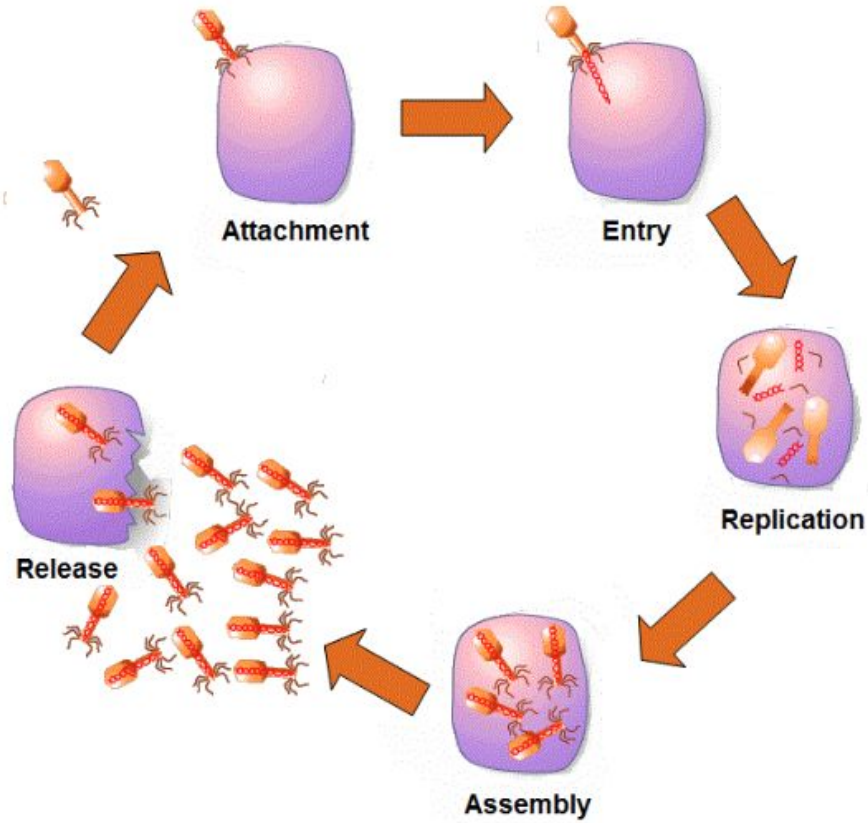
# Viruses (characteristics of viruses, infection of host, viral life cycles)



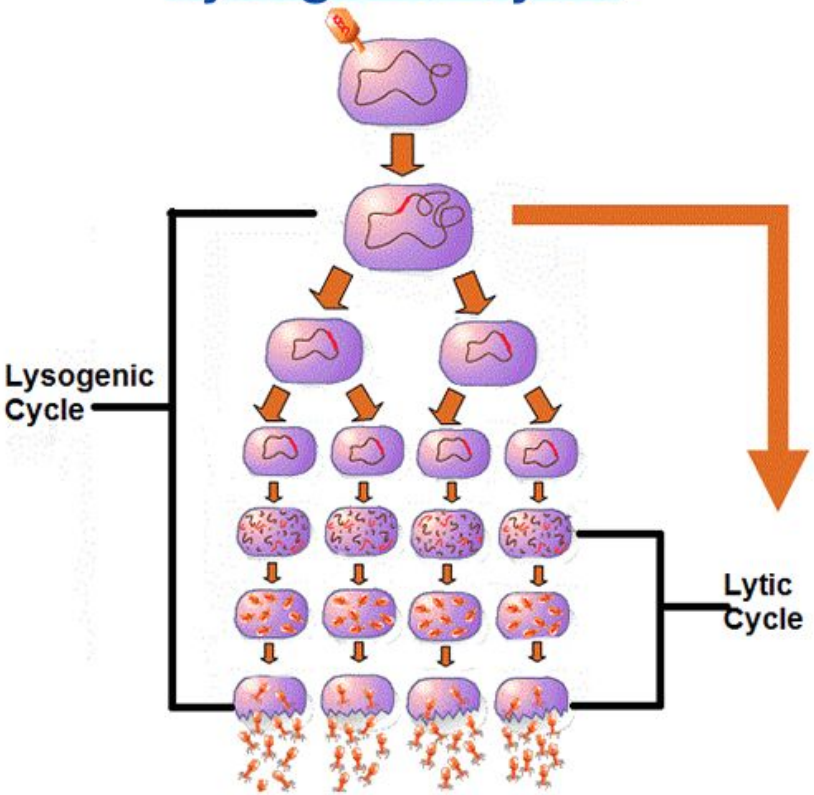




1. **Attachment** The phage attaches to the surface of the host.
2. **Penetration** The viral DNA enters the host cell.
3. **Biosynthesis** Phage DNA replicates and phage proteins are made.
4. **Maturation** New phage particles are assembled.
5. **Lysis** The cell lyses, releasing the newly made phages.

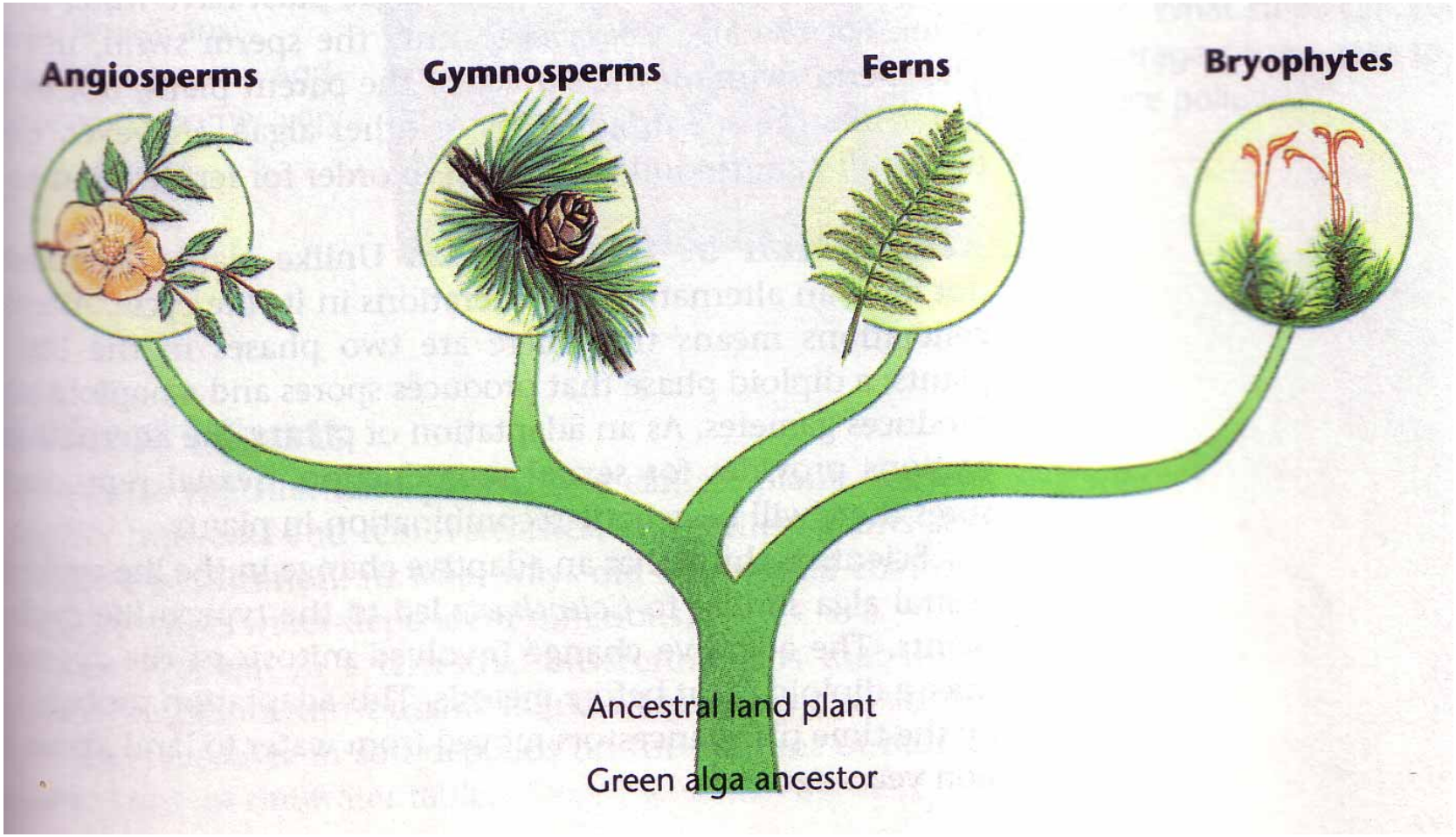
## Lytic Cycle

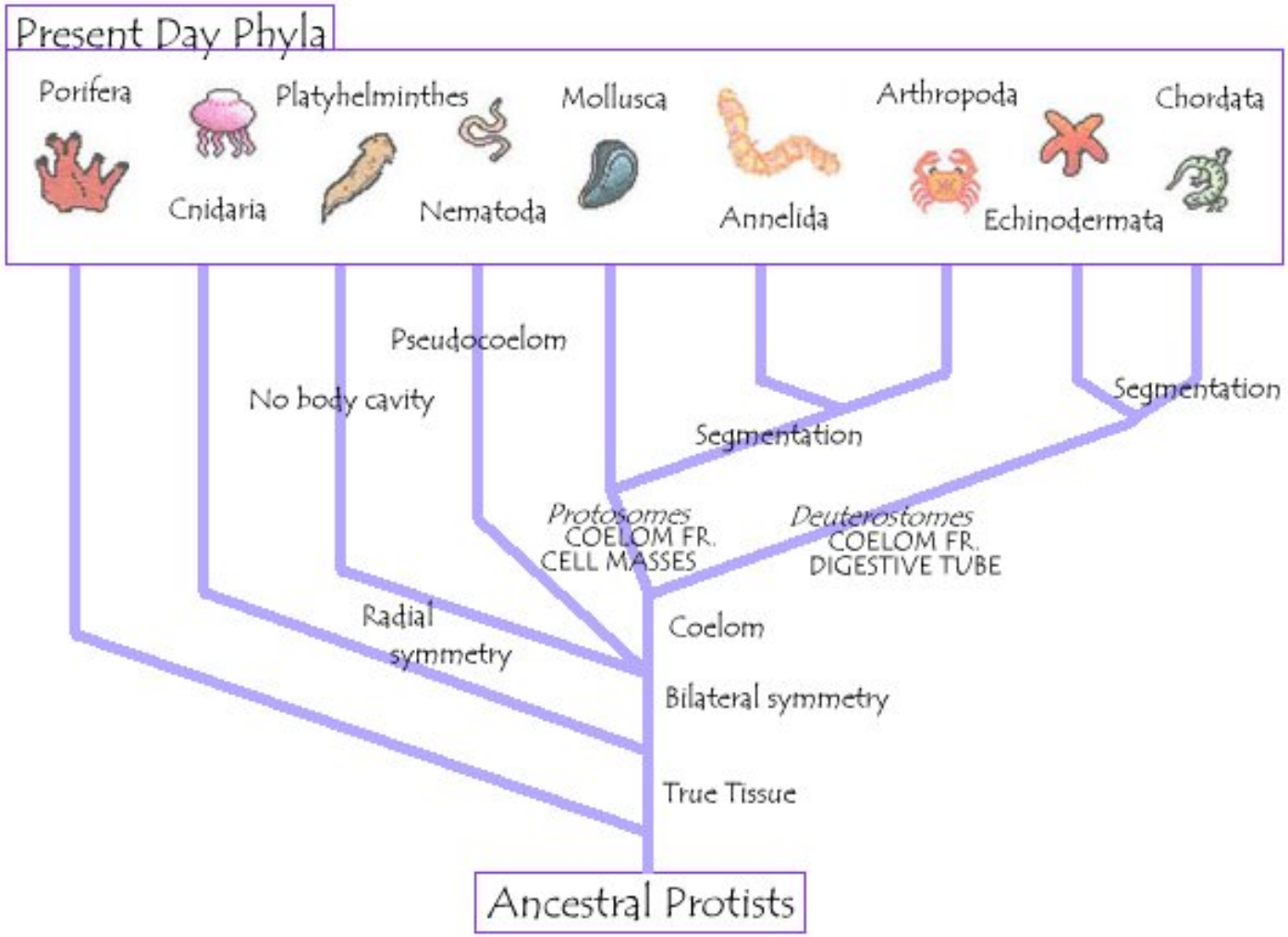



## Lysogenic Cycle



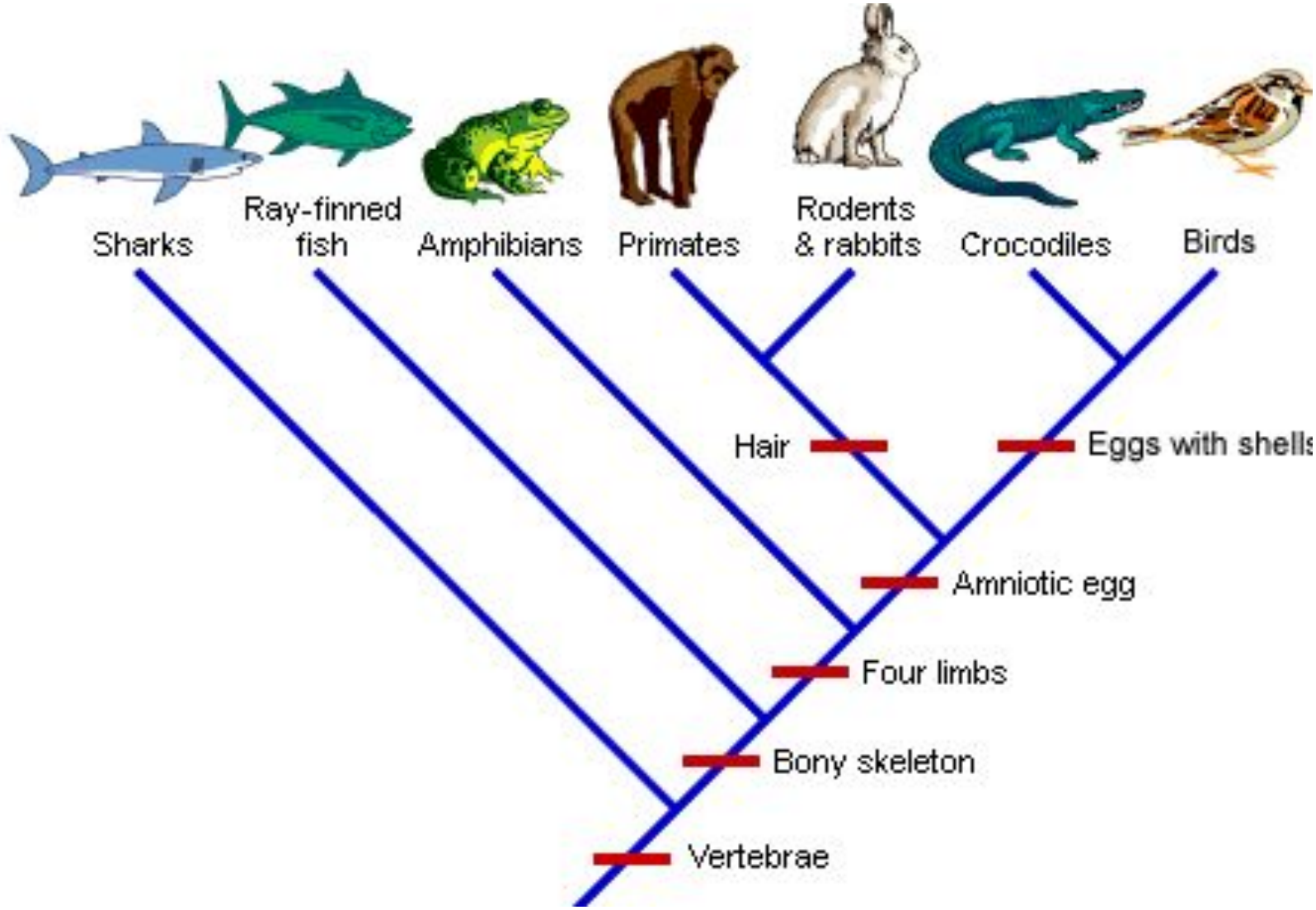

*Source: Adapted from Lysogenic Cycle, Discovery Health*


Angiosperms
Gymnosperms
Ferns
Bryophytes
Ancestral land plant
Green alga ancestor




# Phylogenetic Tree of *KINGDOM ANIMALIA*

# Interpret a cladogram.



# Dichotomous keys

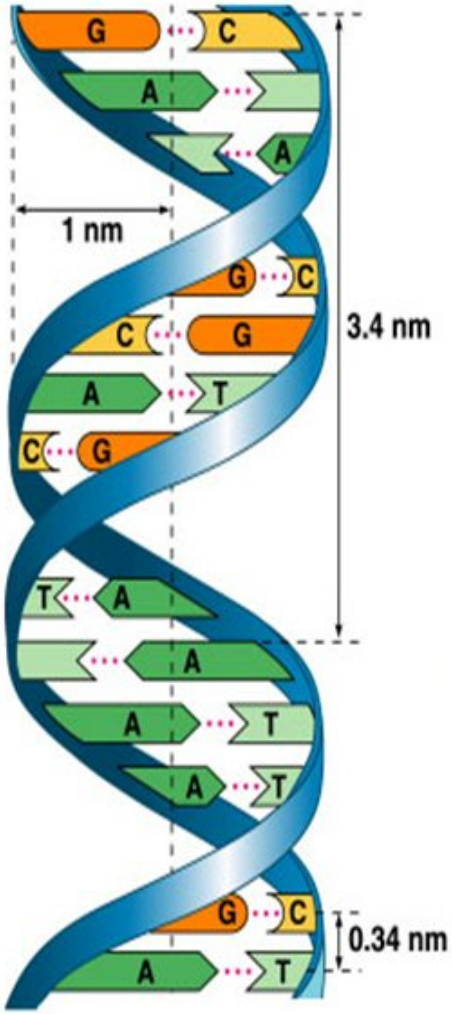
## Spider key

- plants
  - narrow leaf
    - bell-like flower ..... bluebell
    - trumpetlike flower ..... wild daffodil
  - broad leaf
    - top petal overhangs lower petal ..... dead nettle
    - top petal does not overhang lower petal
      - heart-shaped leaf ..... lesser celandine
      - club-shaped leaf ..... primrose

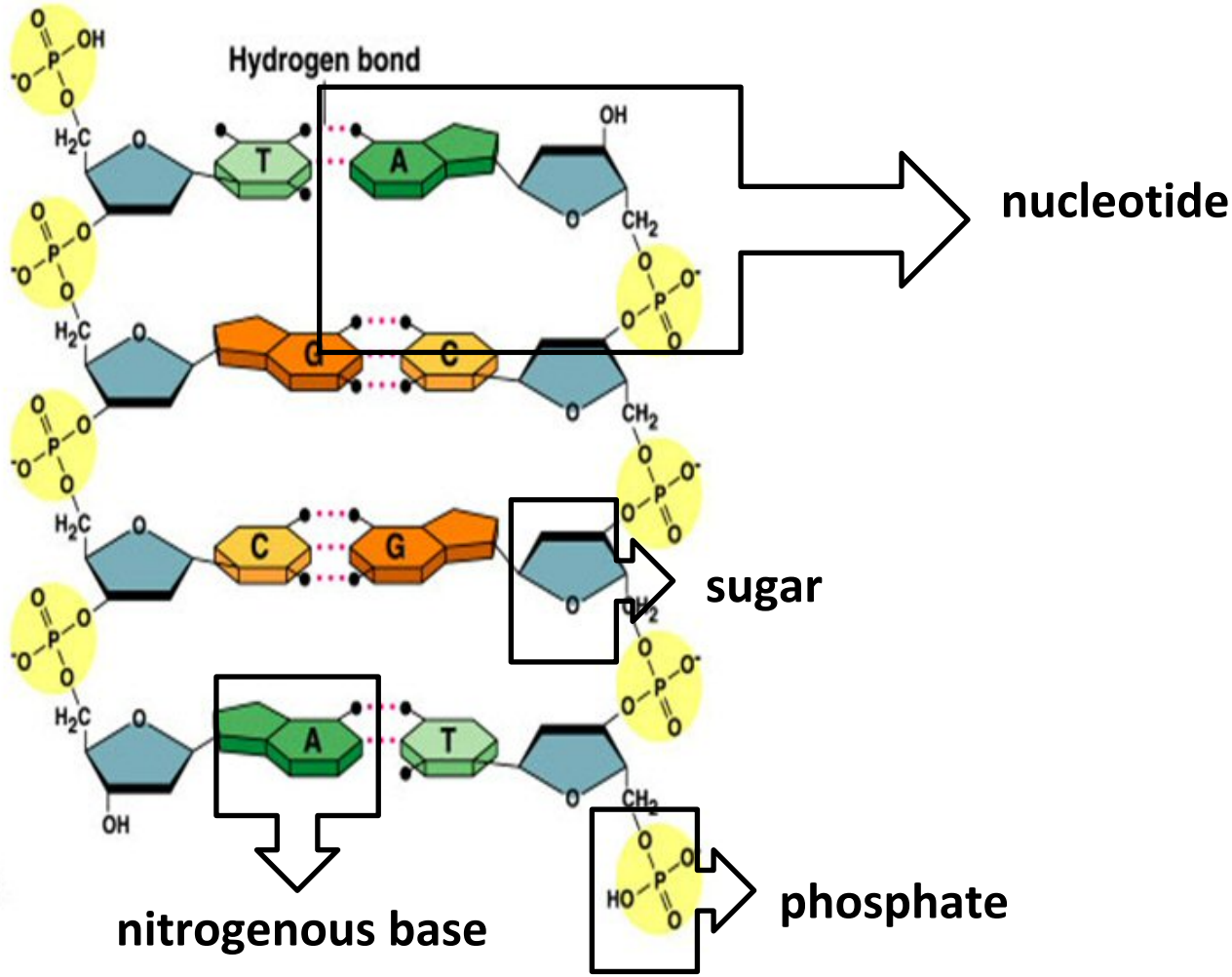
## 'Go to' instructions

1. narrow leaf ..... go to 2
   broad leaf ..... go to 3
2. bell-like flower ..... bluebell
   trumpetlike flower ..... wild daffodil
3. top petal overhangs lower petal ..... dead nettle
   top petal does not overhang lower petal ..... go to 4
4. heart-shaped leaf ..... lesser celandine
   club-shaped leaf ..... primrose

# DNA: structure

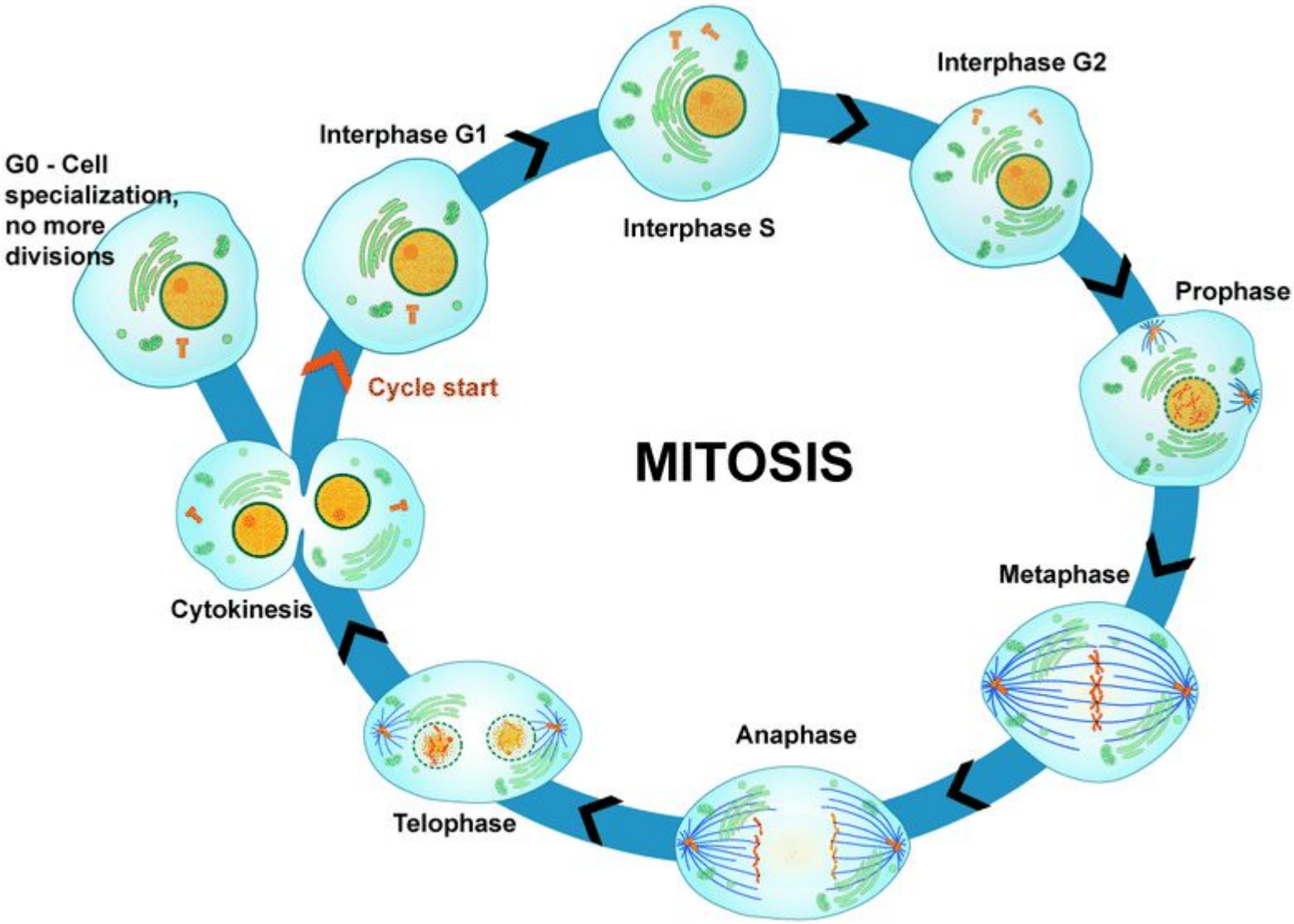



(a) Key features of DNA structure

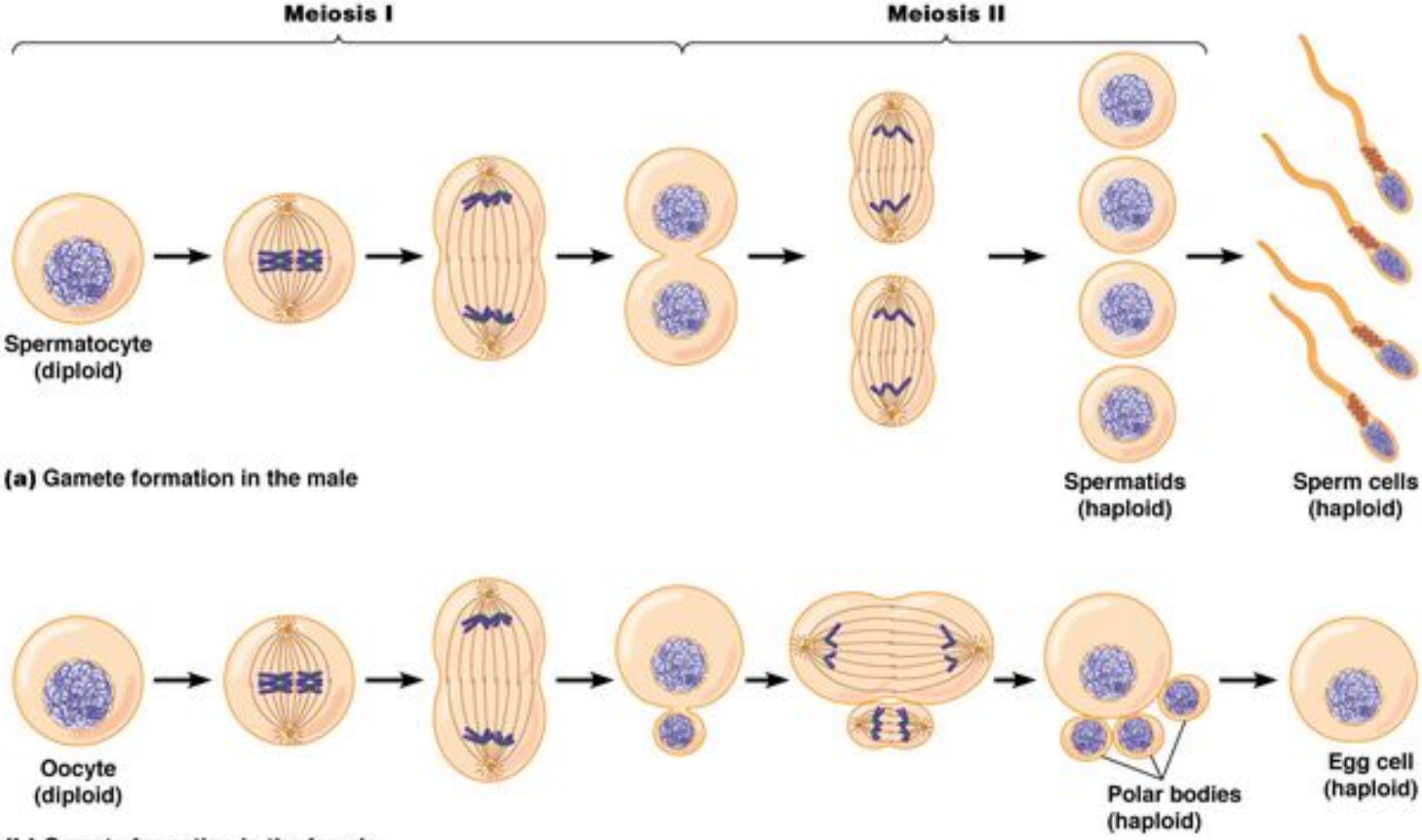



(b) Partial chemical structure

# Cell division: stages of mitosis (including diagrams)



# stages of meiosis (including diagrams)



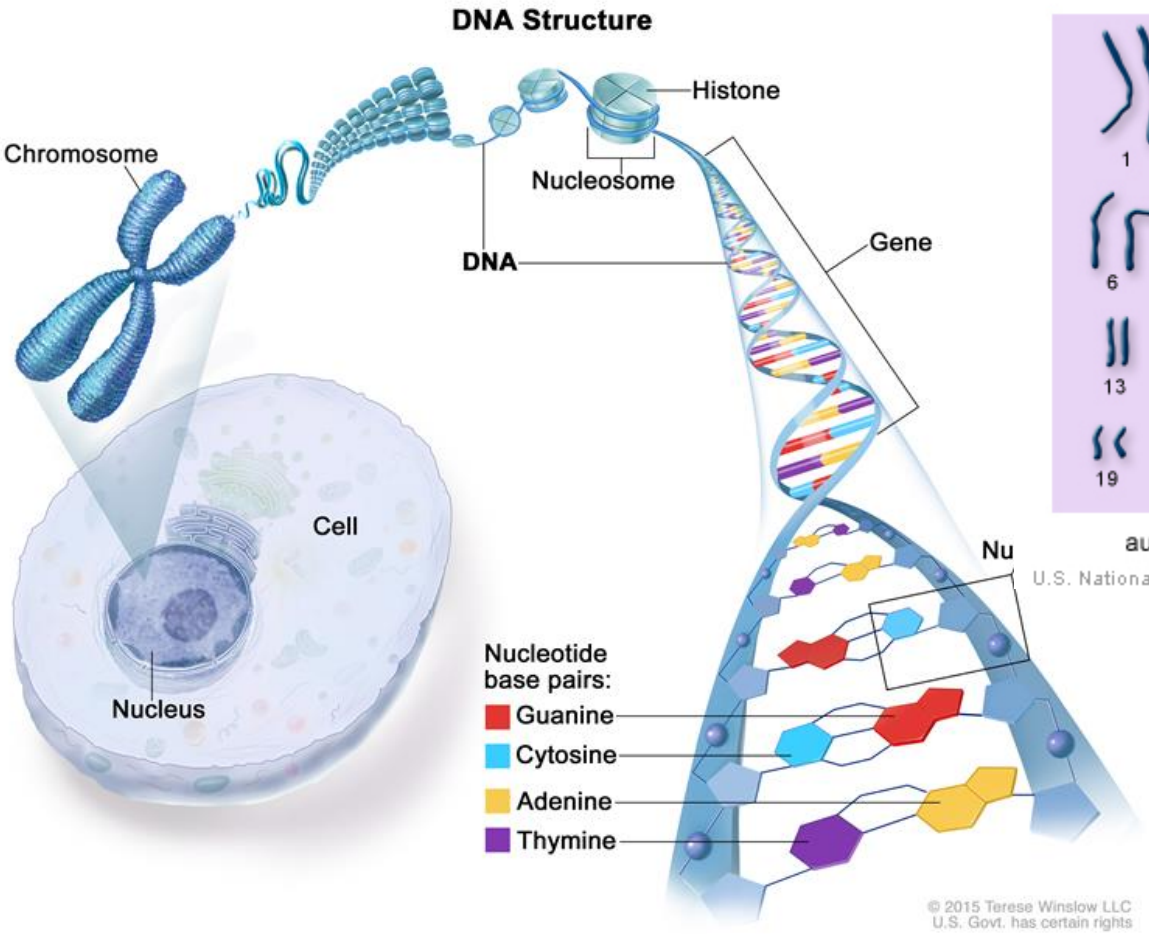

(a) Gamete formation in the male

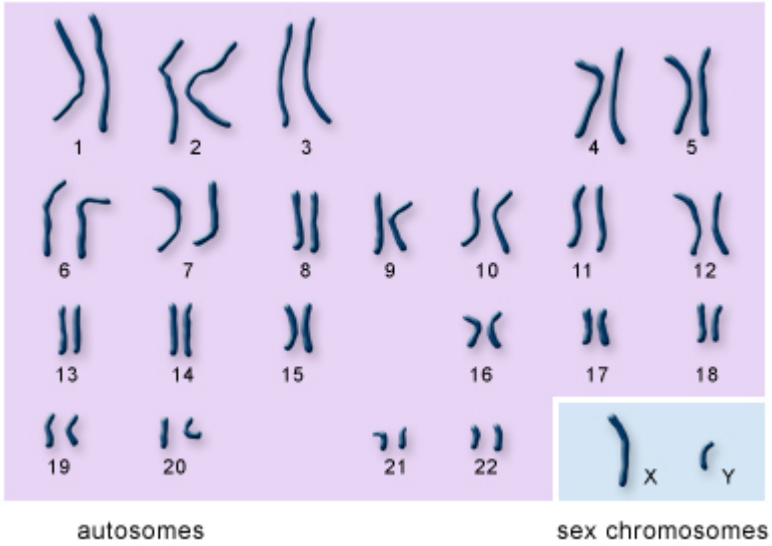
(b) Gamete formation in the female

# Compare mitosis and meiosis

| Process | Mitosis | Meiosis |
|---|---|---|
| Purpose | | |
| Where does it occur? | | |
| Process begins with what type of cell? | | |
| Process begins with haploid or diploid cells? | | |
| Process ends with what type of cell? | | |
| Process ends with haploid or diploid cells? | | |

# Chromosomes (homologous pairs, sex chromosome, autosome, chromatids, alleles, loci, dominant, recessive)



# Mendel's Laws

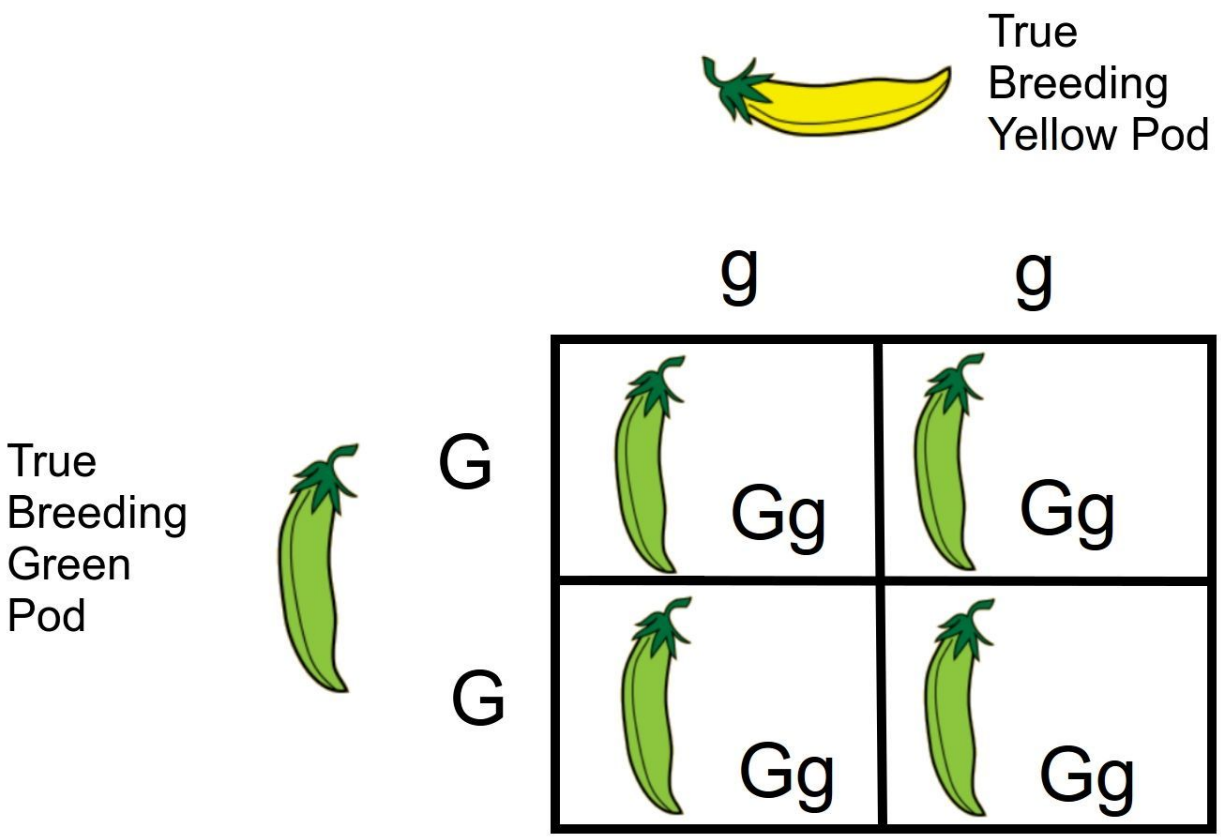
Law of Segregation (Monohybrid 3:1)

- allele pairs separate or segregate during gamete formation, and randomly unite at fertilization

Law of Independent Assortment (Dihybrid 9:3:3:1)

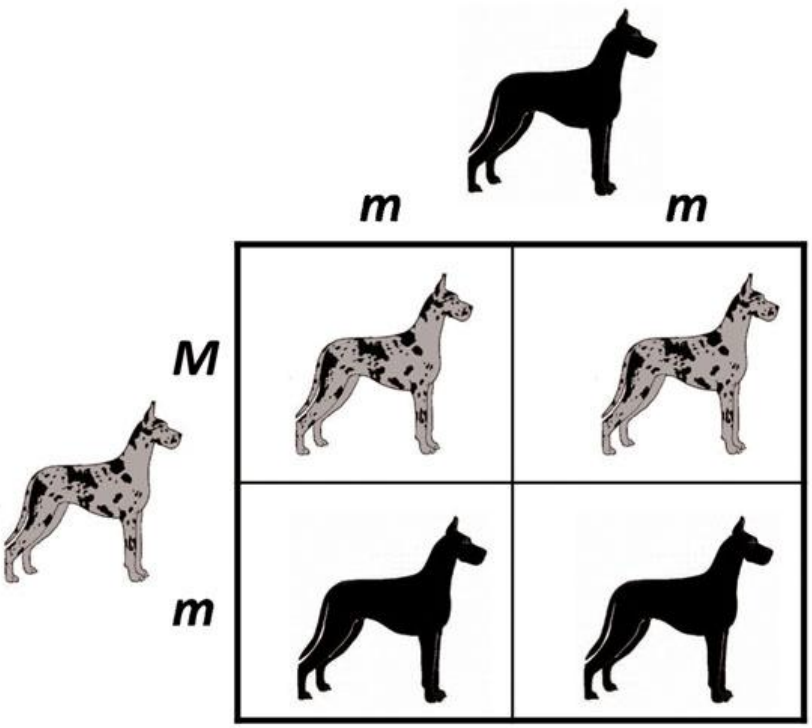
- the alleles of two (or more) different genes get sorted into gametes independently of one another.

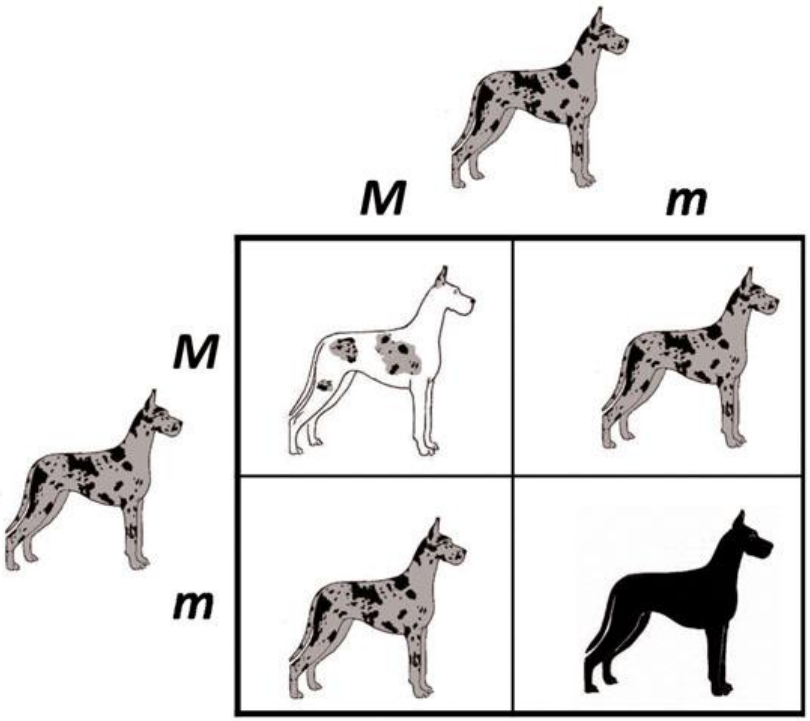
solving genetics problems (dominant, recessive, codominant, homozygous, heterozygous, phenotype, genotype)




**Identify dominant and recessive alleles.**
**Identify phenotypes and genotypes of offspring.**

# What kind of inheritance?




Incomplete dominance

| Recipient | Blood donor | | | |
|---|---|---|---|---|
| | O | A | B | AB |
| O | ✓ | x | x | x |
| A | ✓ | ✓ | x | x |
| B | ✓ | x | ✓ | x |
| AB | ✓ | ✓ | ✓ | ✓ |

# What kind of inheritance?

Codominance & Multiple alleles

| | $I^A$ | $I^A$ |
|---|---|---|
| $I^B$ | $I^A I^B$ | $I^A I^B$ |
| $i$ | $I^A i$ | $I^A i$ |

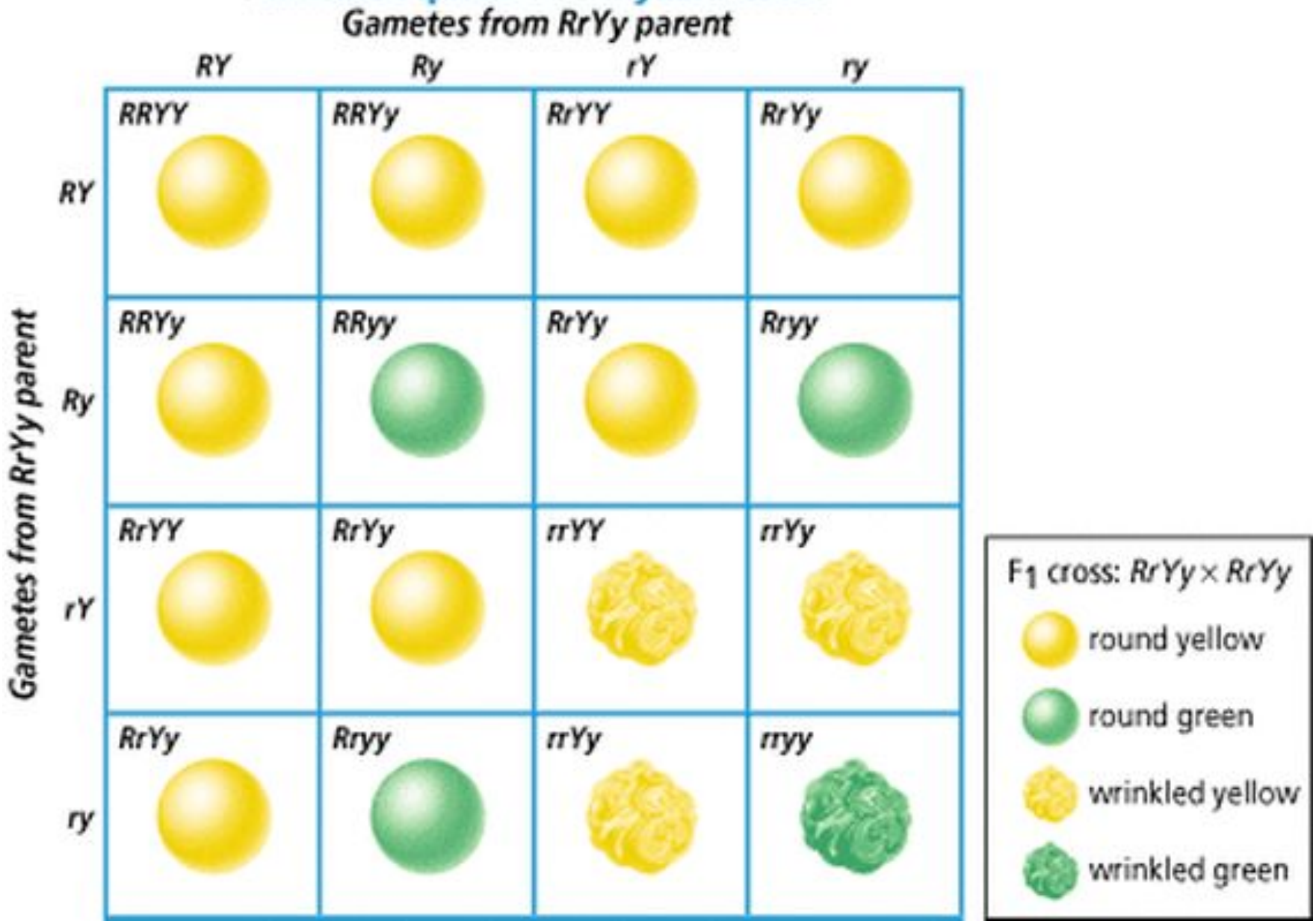
Mother (carrier)

Father (unaffected)

| | $X_H$ | $X_h$ |
|---|---|---|
| $X_H$ | $X_H X_H$ | $X_h X_H$ |
| $Y$ | $X_H Y$ | $X_h Y$ |

X-linked recessive

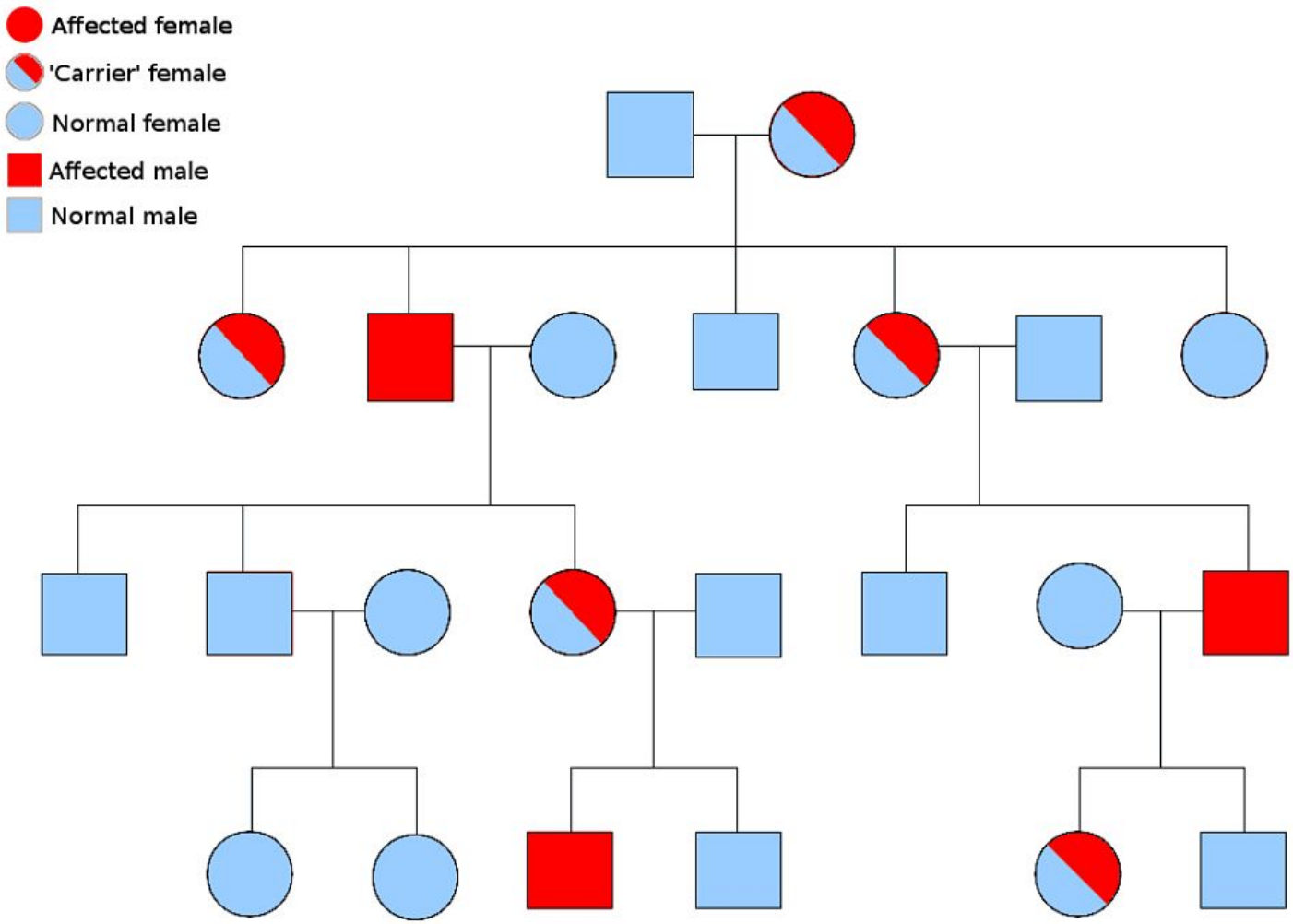
## Punnett Square of Dihybrid Cross



# Practice

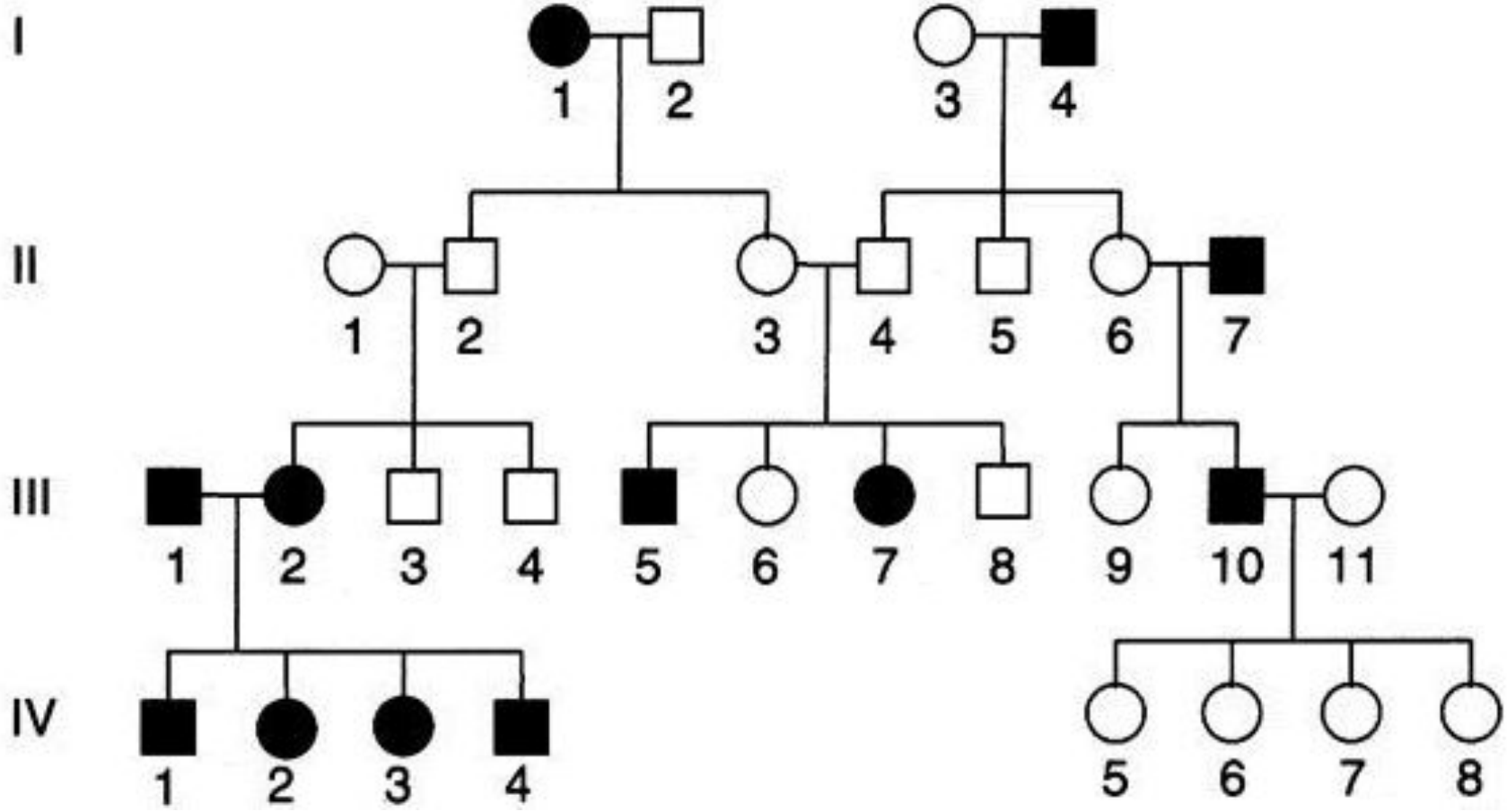
- A man has hemophilia (an X-linked recessive disorder). What is the chance he will have a child with the disease?
- White rabbits crossed with black rabbits produce grey rabbits. What colour rabbits are produced when two grey rabbits mate?
- A man with type A blood (heterozygous) has a child with a woman with type B blood (heterozygous). What is the chance they will have a child with a blood type different from either parent?
- Green and smooth pea seeds are dominant over yellow and wrinkled seeds. A yellow, wrinkled seeded plant is crossed with a dihybrid. What is the probability that the offspring will have yellow and wrinkled seeds?
- A woman with Huntington's disease (an autosomal dominant disorder) has a child. What is the probability that her child will develop Huntington's?

What type of inheritance is shown?




X-linked recessive

What type of inheritance is shown?

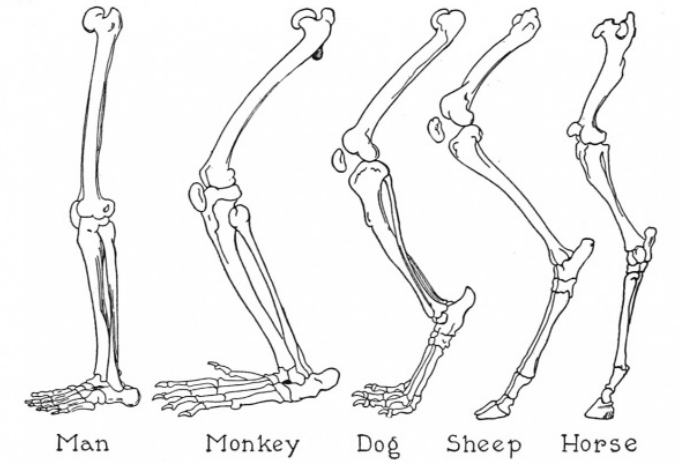


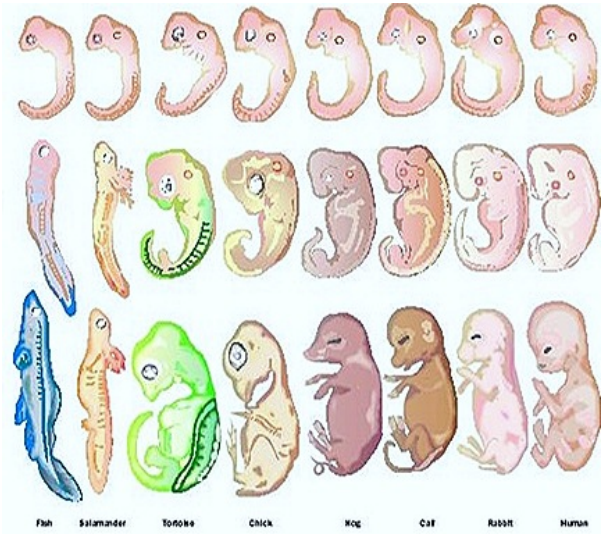

Autosomal recessive

# Darwin; definition of evolution

- **Evolution** is change in the heritable characteristics of biological populations over successive generations.
- **Natural selection** is the process whereby organisms better adapted to their environment tend to survive and produce more offspring.

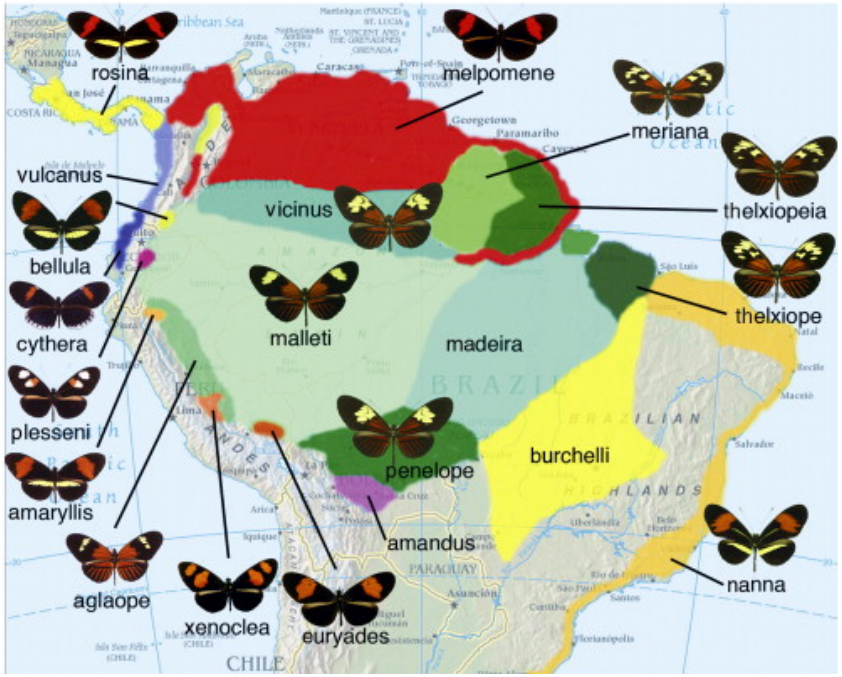
# Evidence for evolution



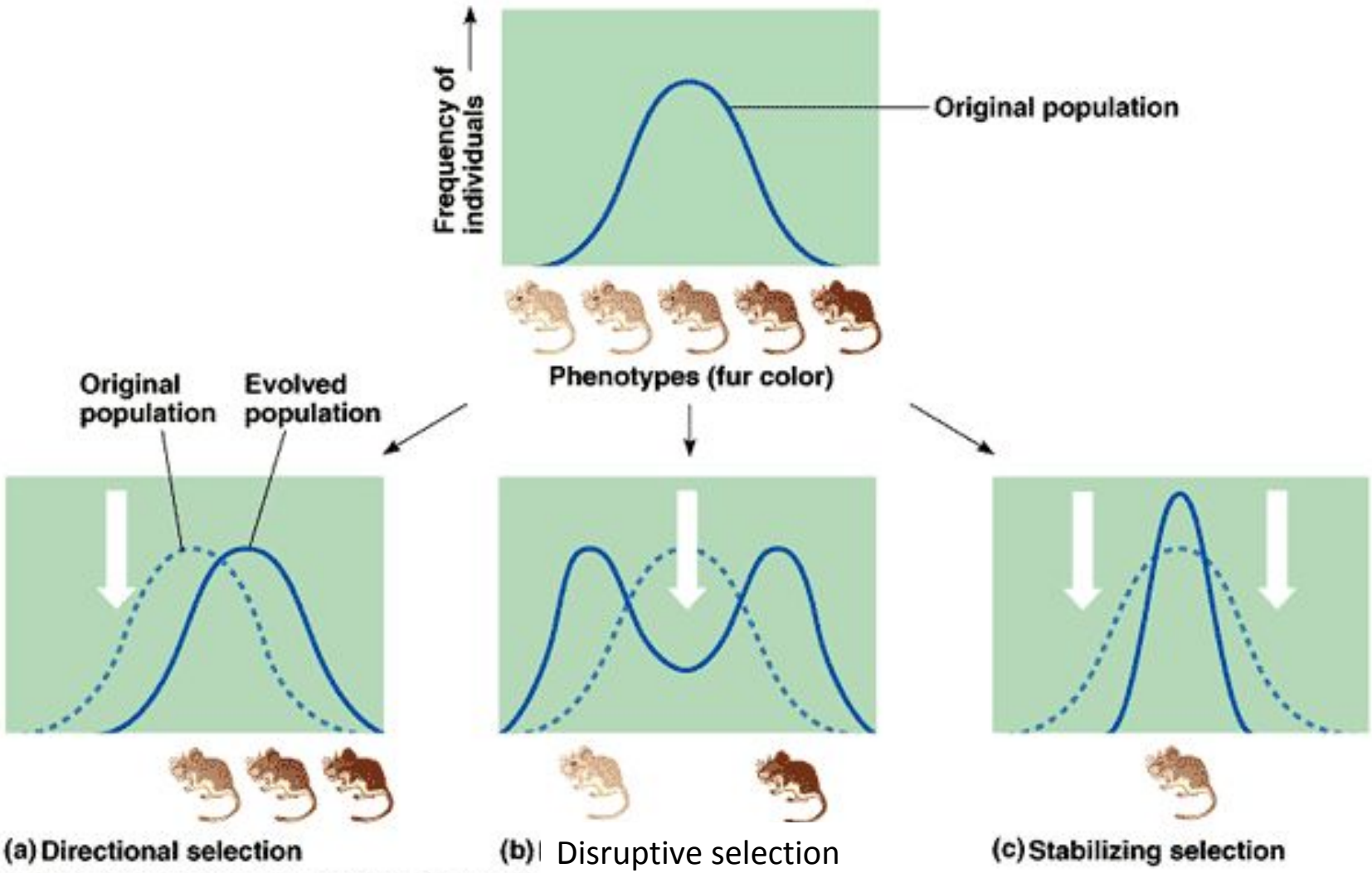




Example: cytochrome c

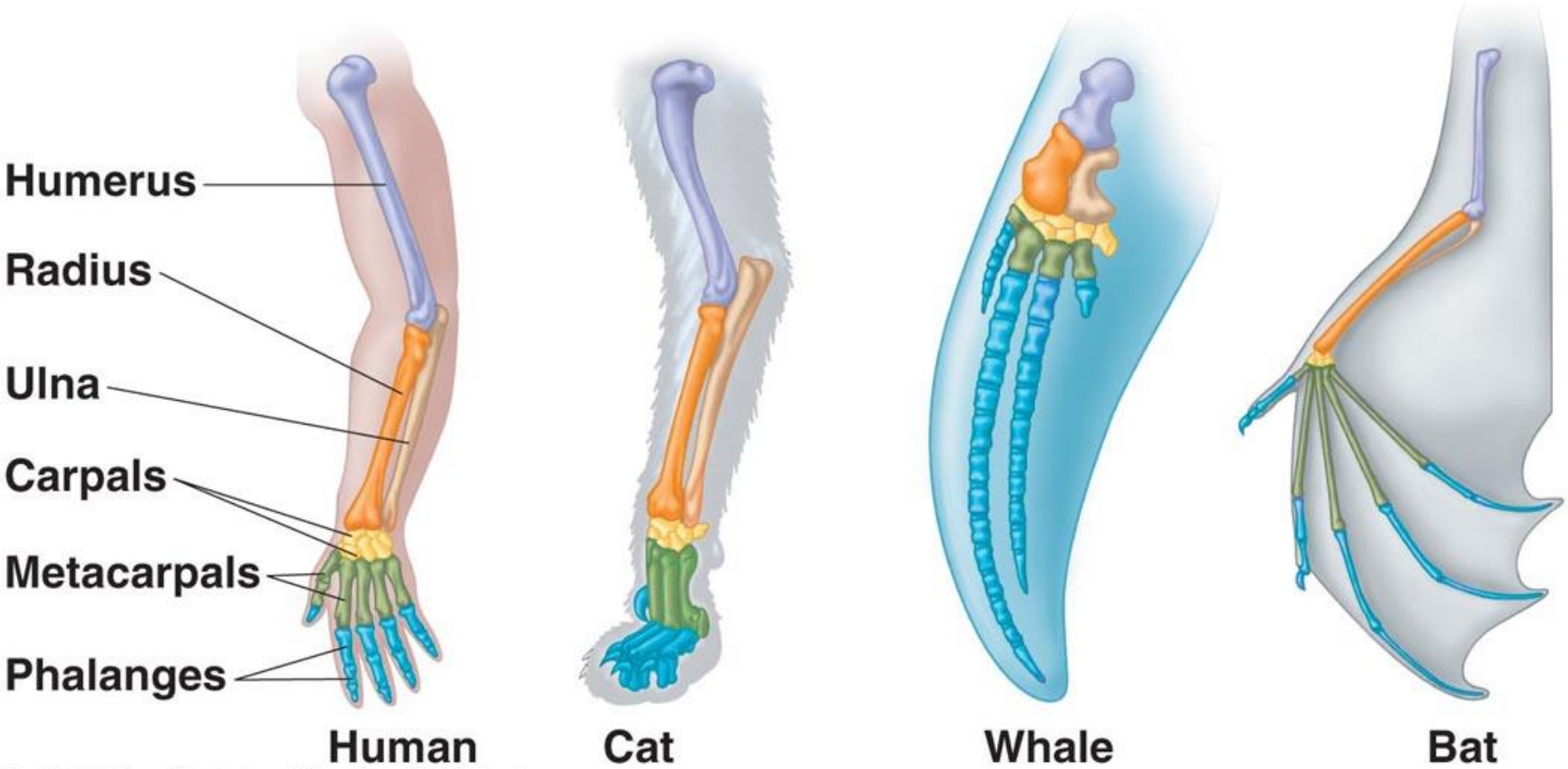
```
ATTCATCCCGTGCGCTACCCGGATGCAGTACGTAGCGTAGCGTAGTGTG  HUMAN
ATTCTTCCGGTGCGCTACCCGGAAGCAGTTCCAAGCCTAGCGCAGTGT-  CHICKEN
ATTGATCCCGTGCGCTACCCGGATGCAGTACGTAGCTTAGCGTAGTGTG  MOUSE
ATTGAACCCGTGCGCTACTCGGATGCAGTACGTAGCGTACCGTACTGAG  HORSE
```




# Interpret a graph of a type of selection.



# Evolution terms (homologous structure, vestigial structure)



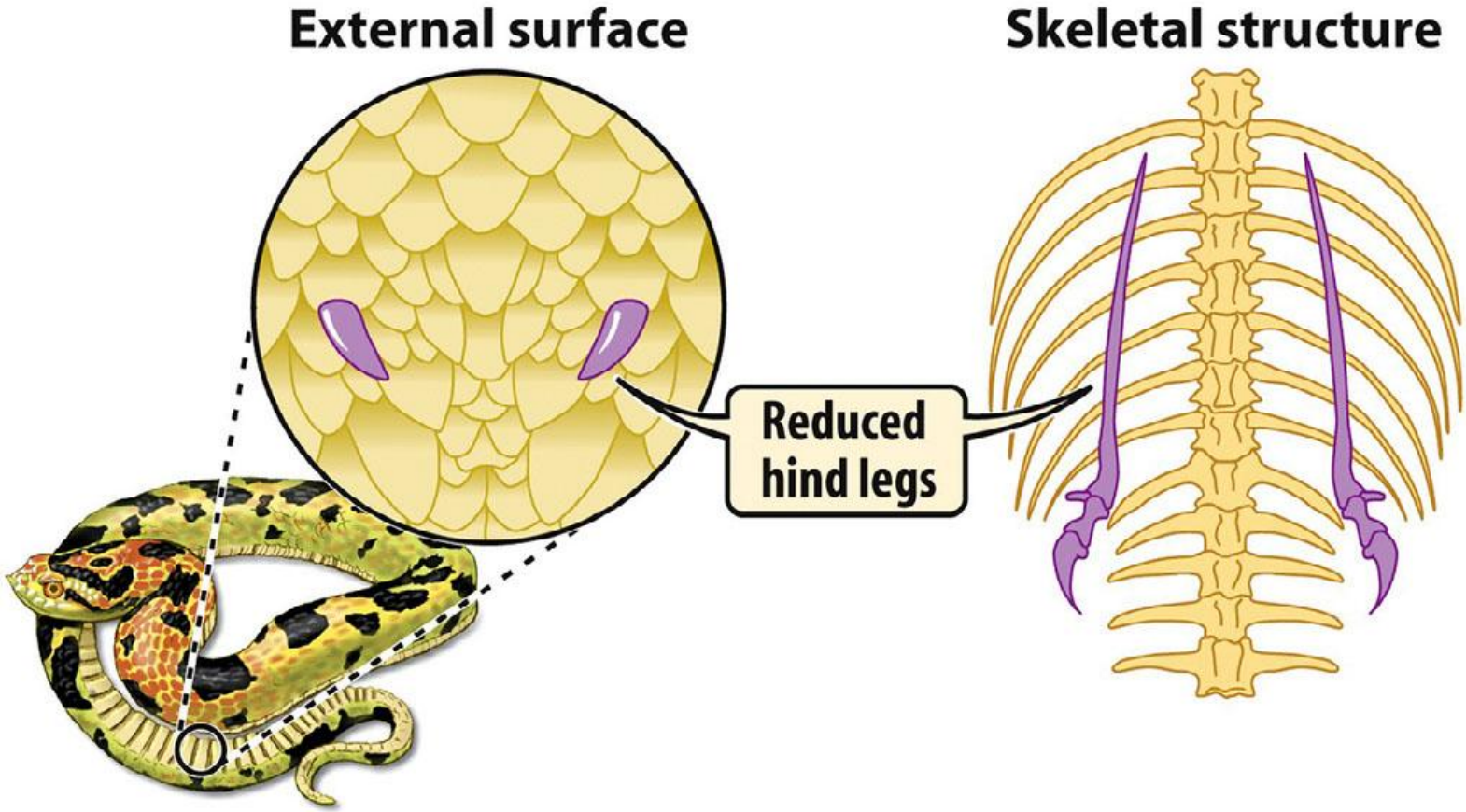
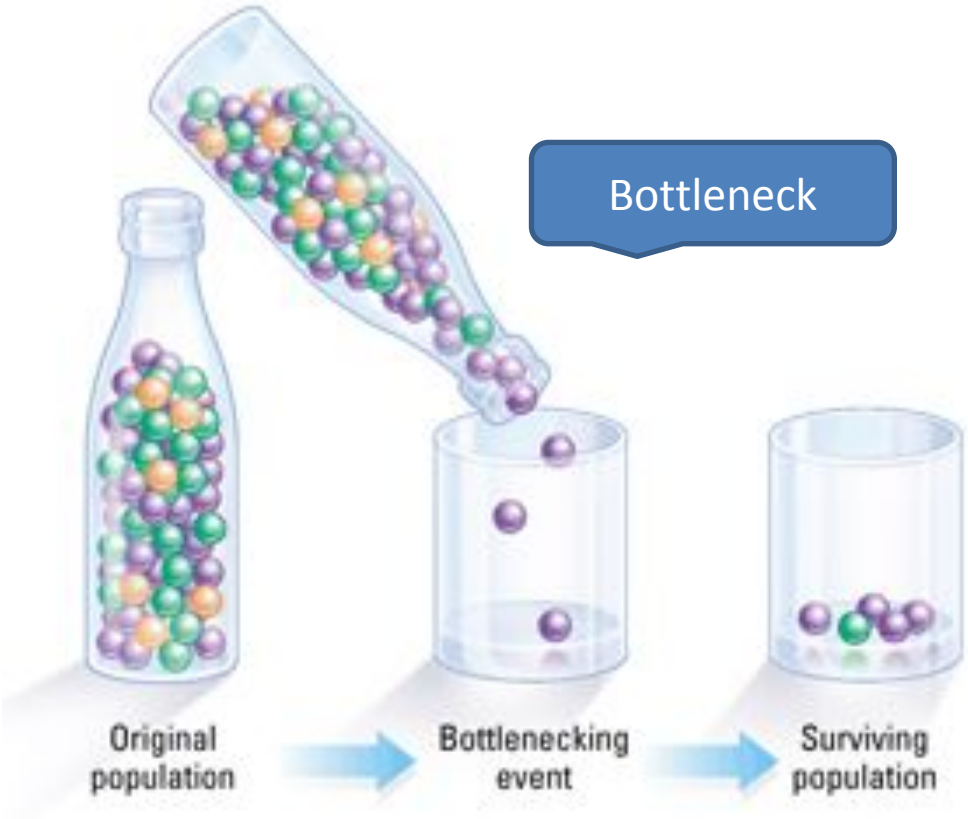
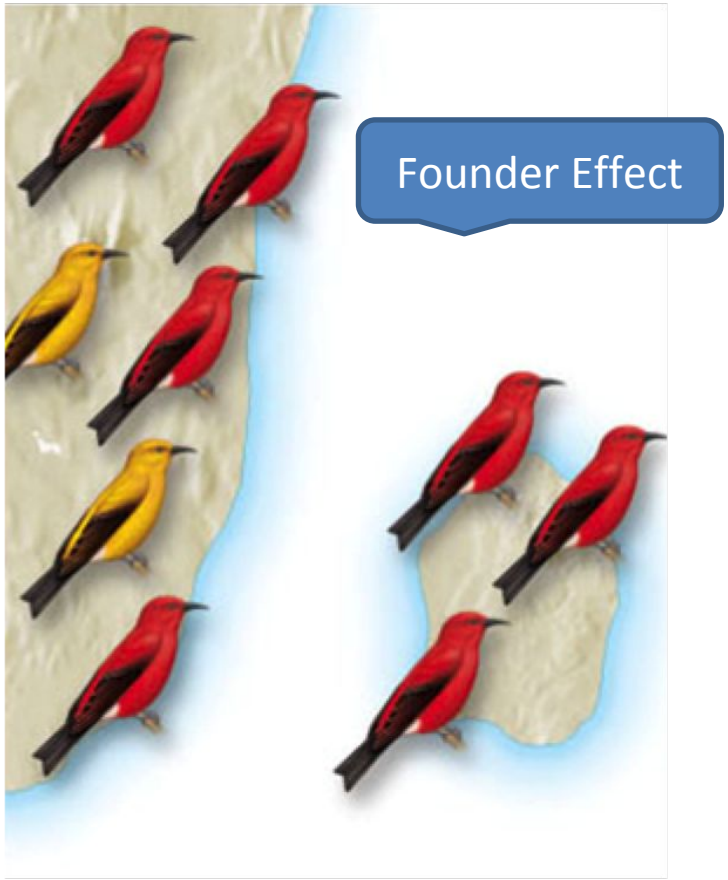
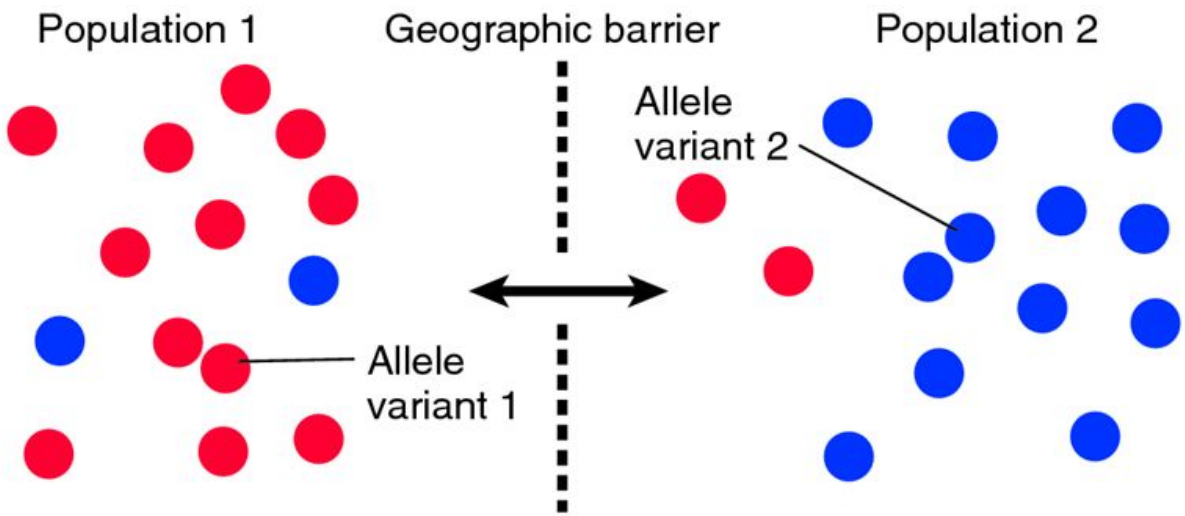


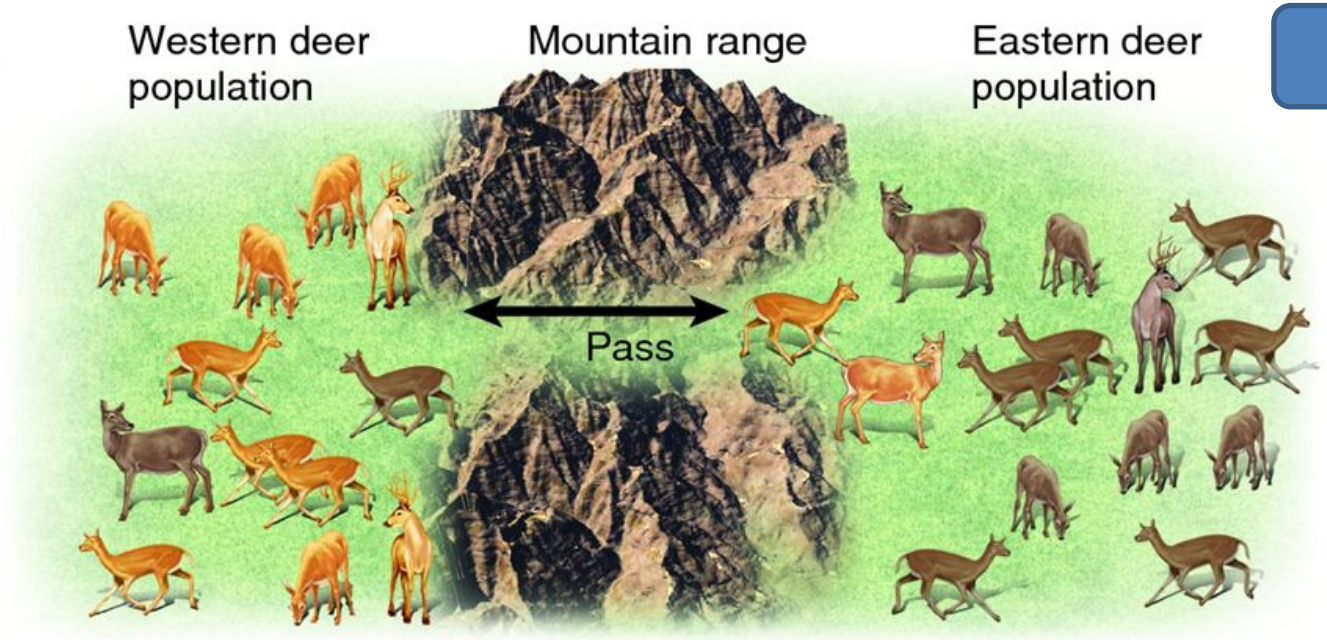

Figure 16-4b Discover Biology 3/e

# founder effect, sexual selection, gene flow, genetic drift, bottleneck effect, convergent/divergent evolution

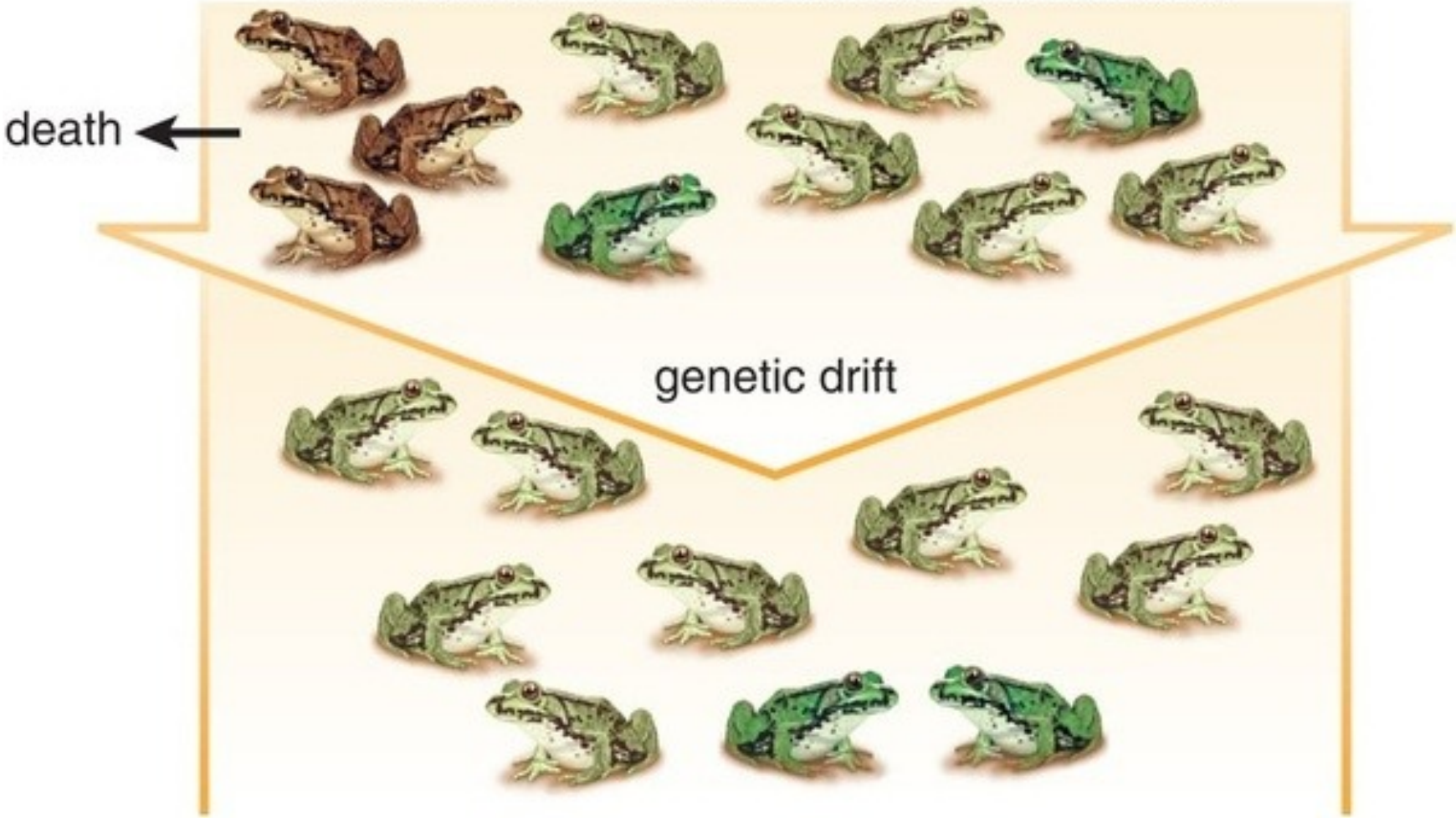


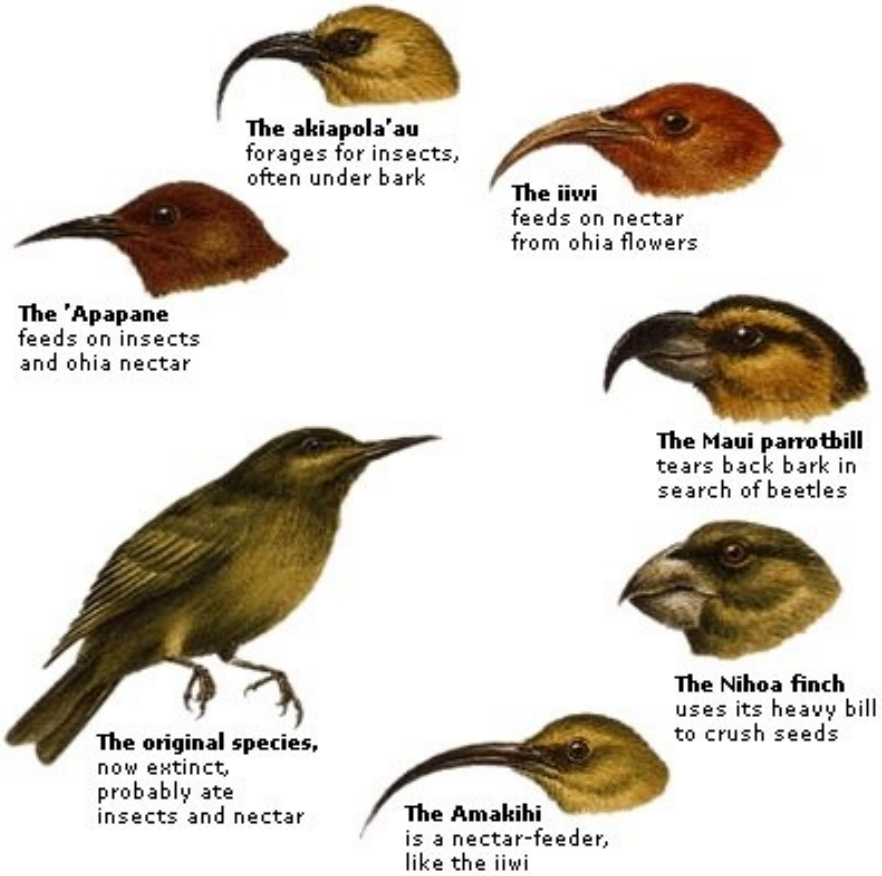

Population 1
Geographic barrier
Population 2
Allele variant 2
Allele variant 1


Western deer population
Mountain range
Eastern deer population
Pass

Gene Flow

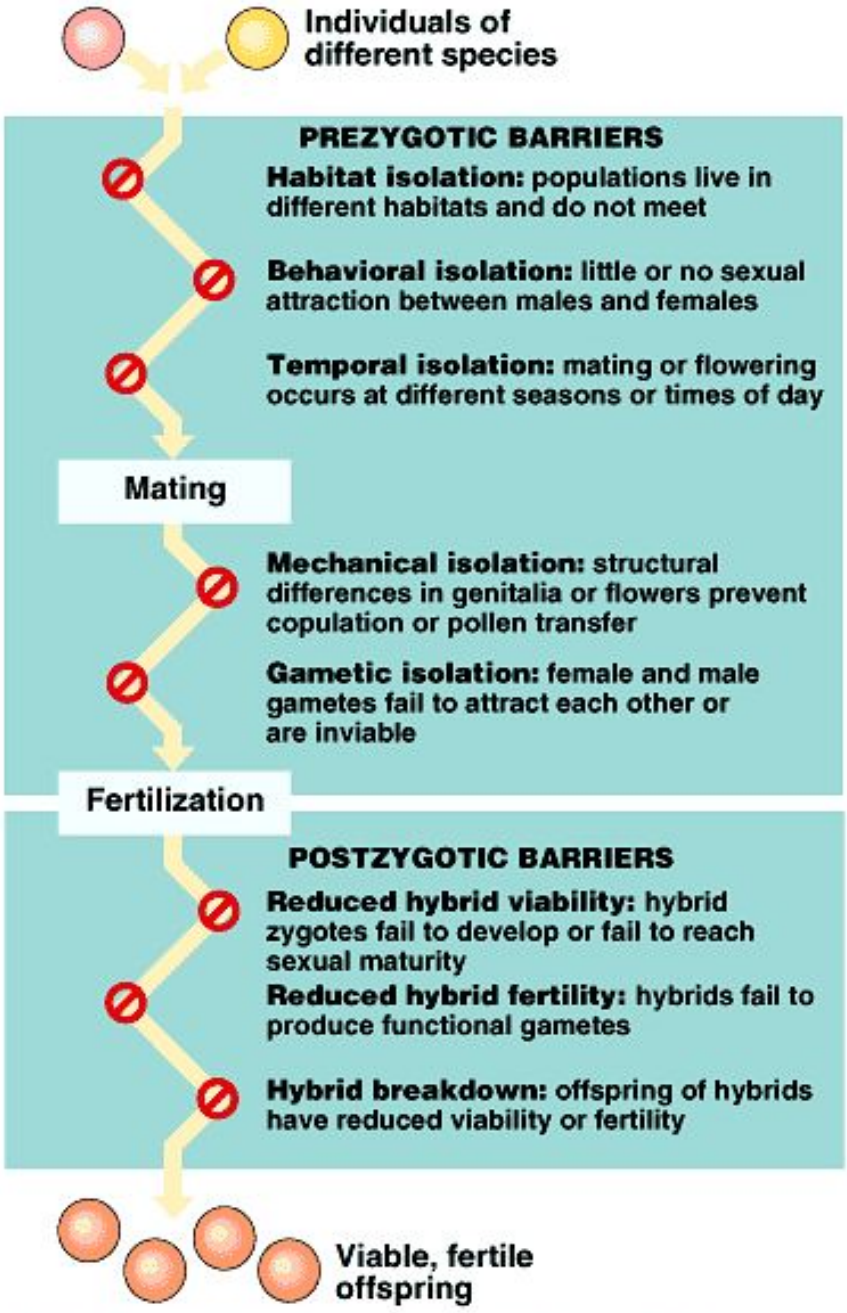


Convergent Evolution

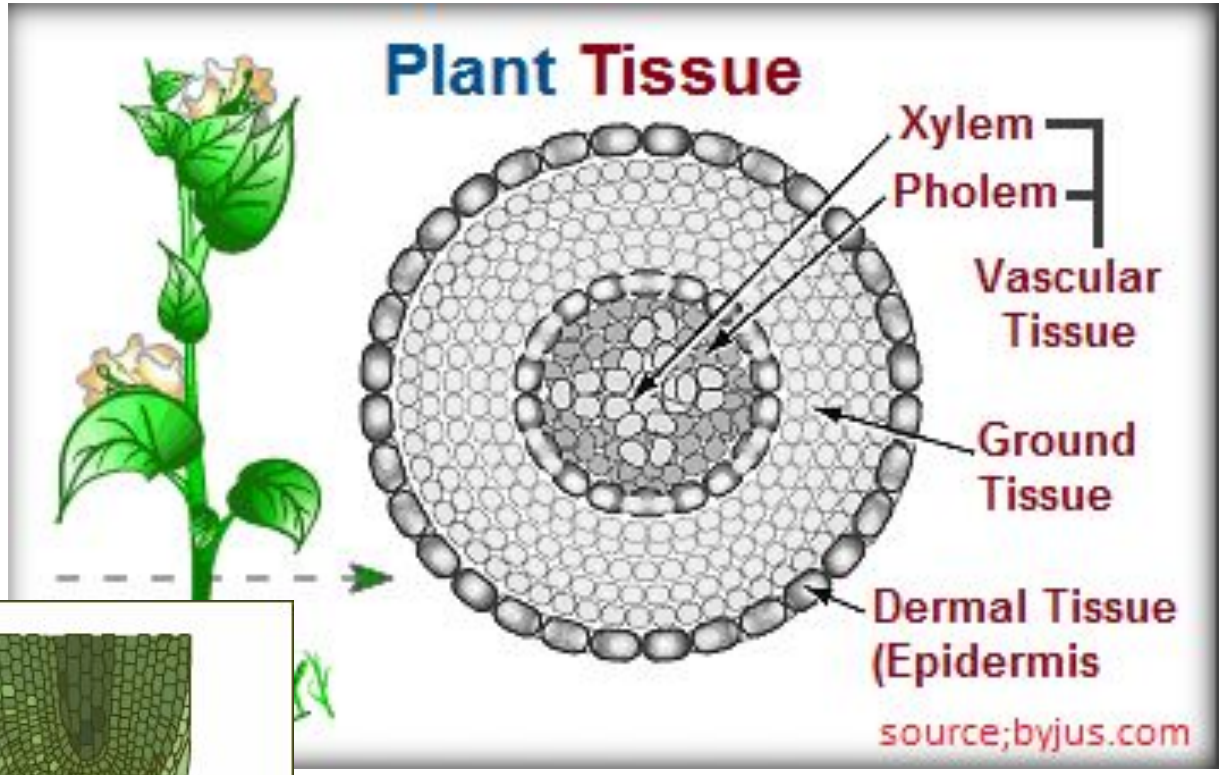


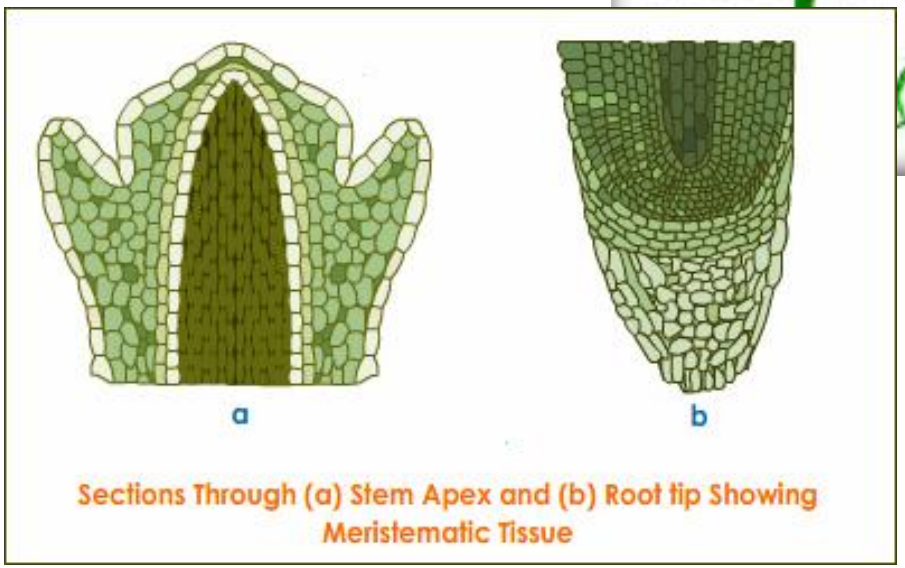

Divergent Evolution

Match the description to the correct reproductive isolating mechanism.

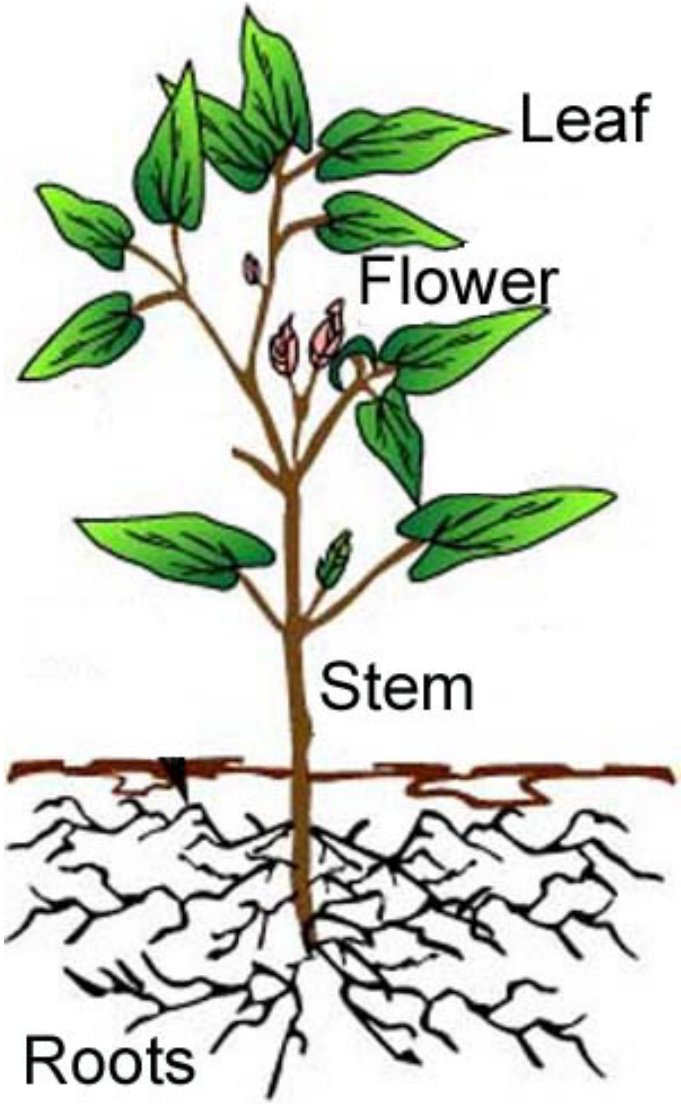


# Plants: plant tissues

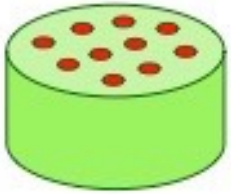
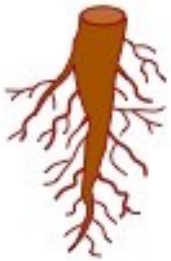
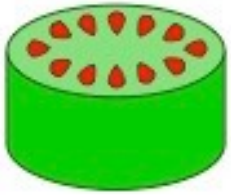


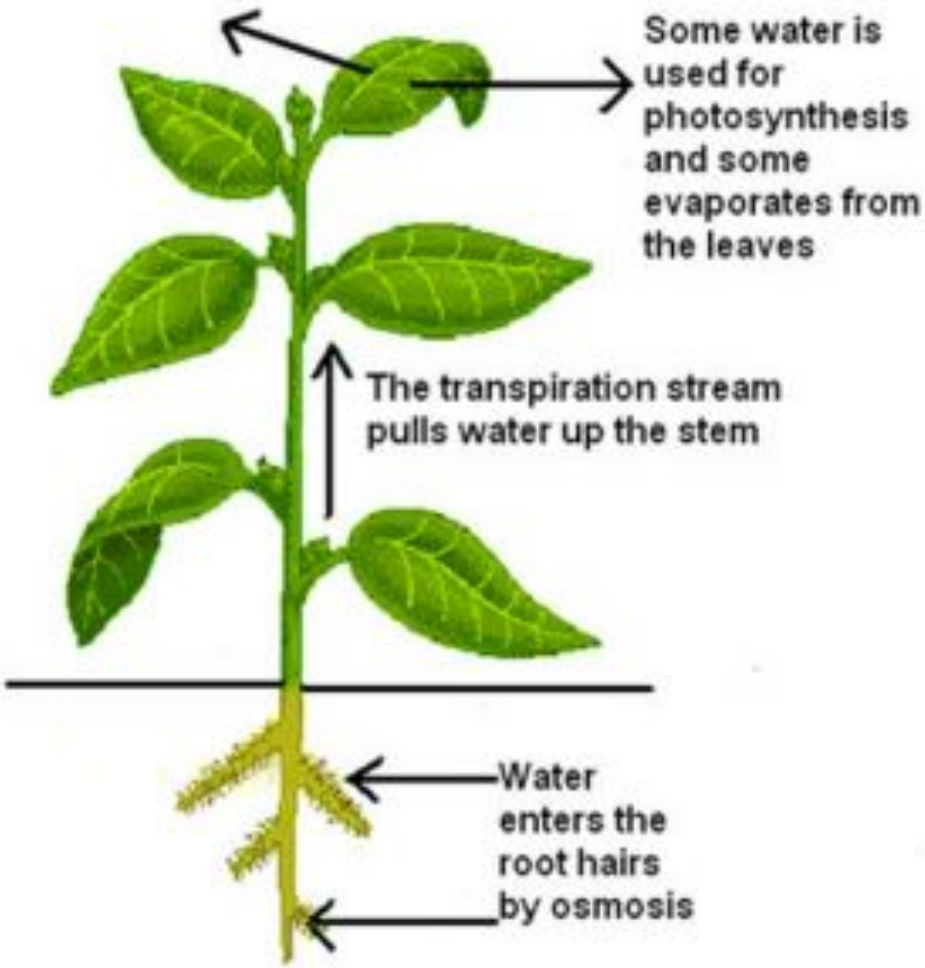
characteristics of roots, stems, leaves

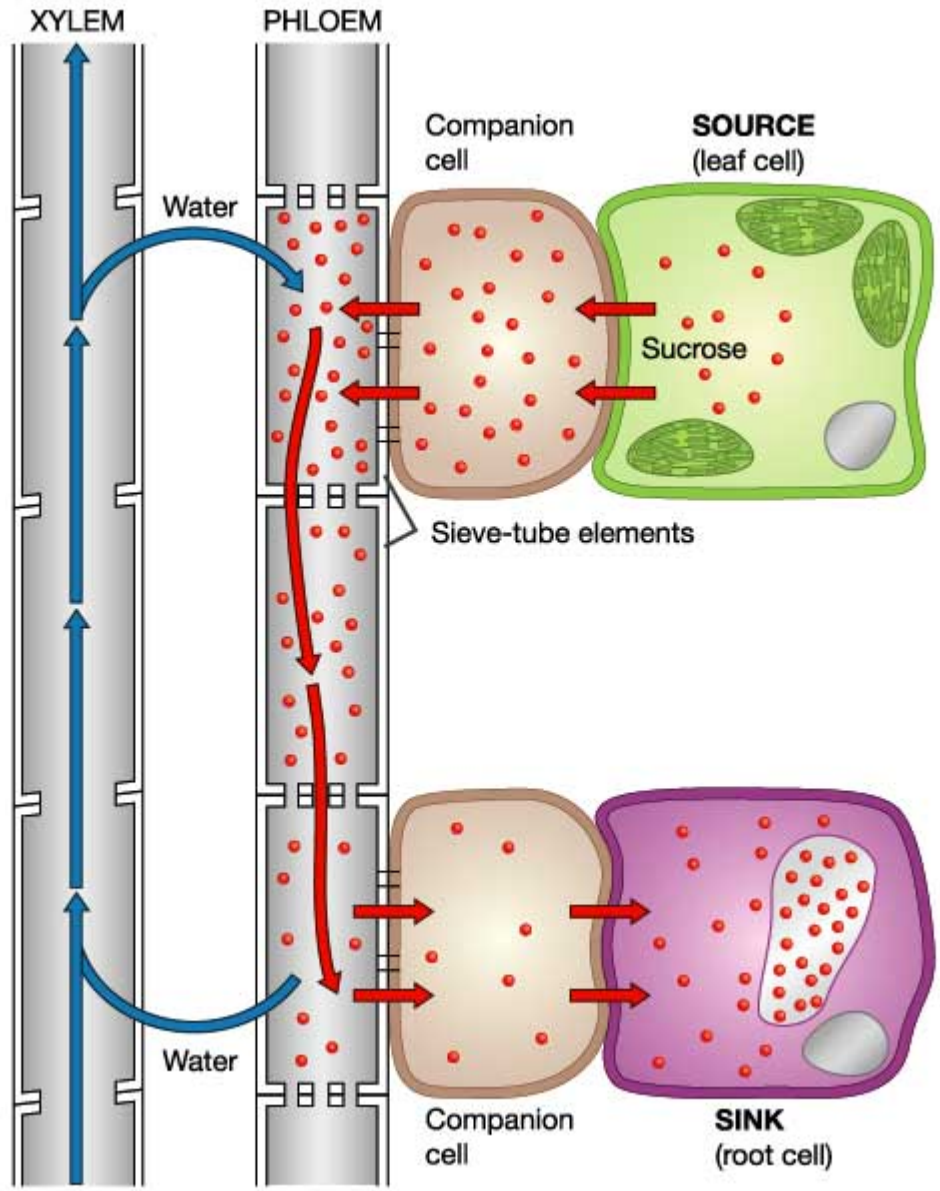


# monocots vs. dicots

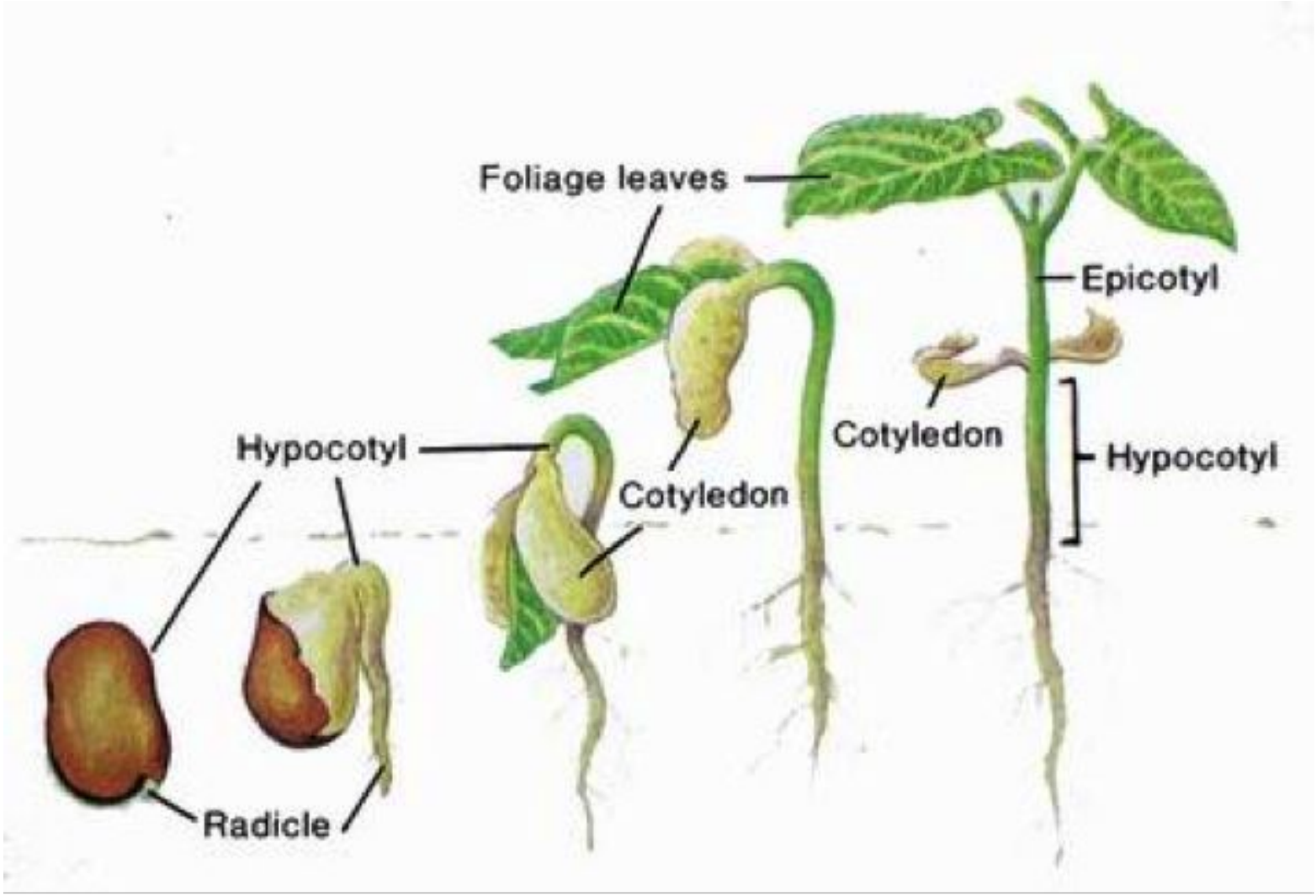
| | Seed | Root | Vascular | Leaf | Flower |
|---|---|---|---|---|---|
| **Monocot** |  |  |  |  |  |
| | One cotyledon | Fibrous roots | Scattered | Parallel veins | Multiples of 3 |
| **Dicot** |  |  |  |  |  |
| | Two cotyledon | Tap roots | Ringed | Net-like veins | 4 or 5 |

# water and food transport in plants



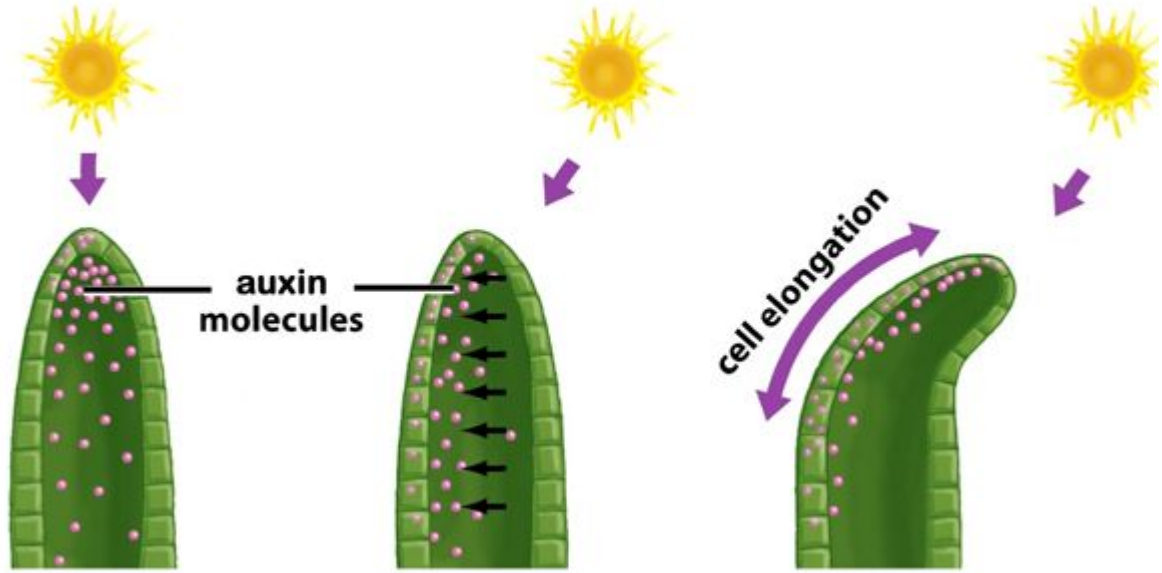



# parts of a germinating seed



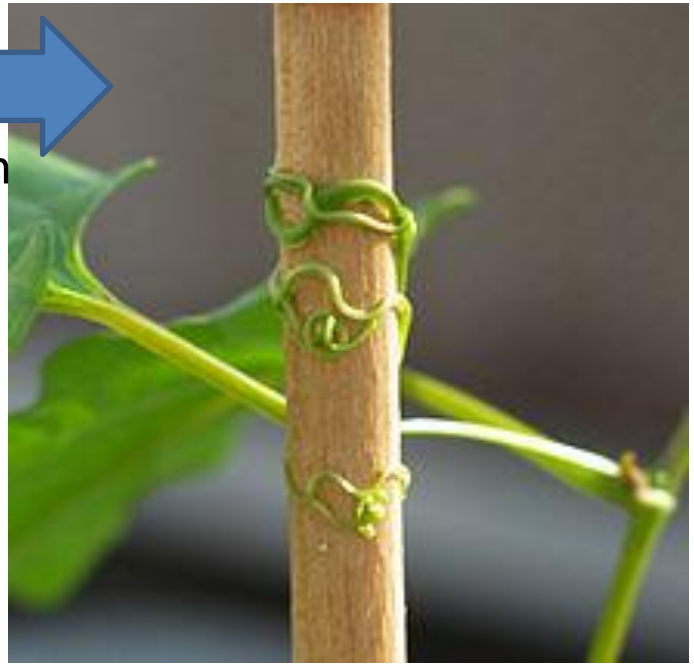
# tropisms

phototropism

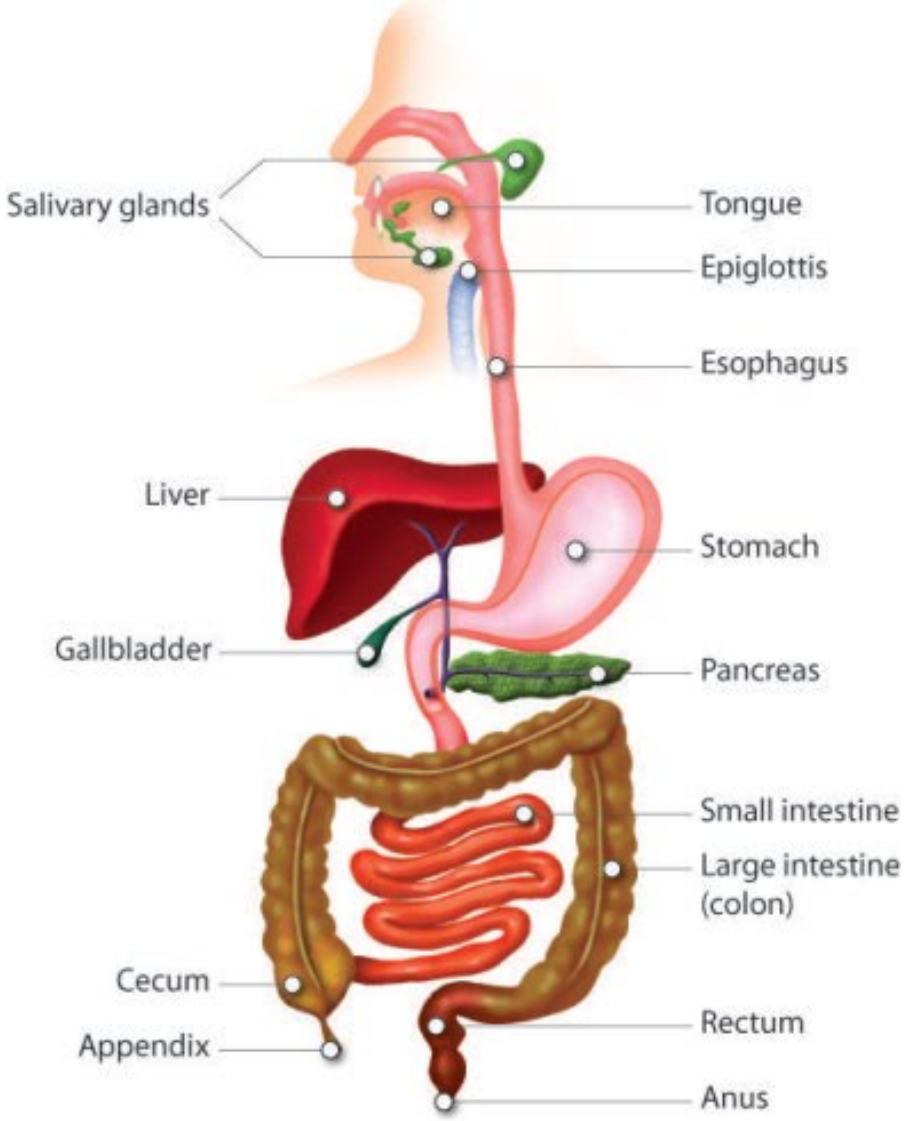



gravitropism

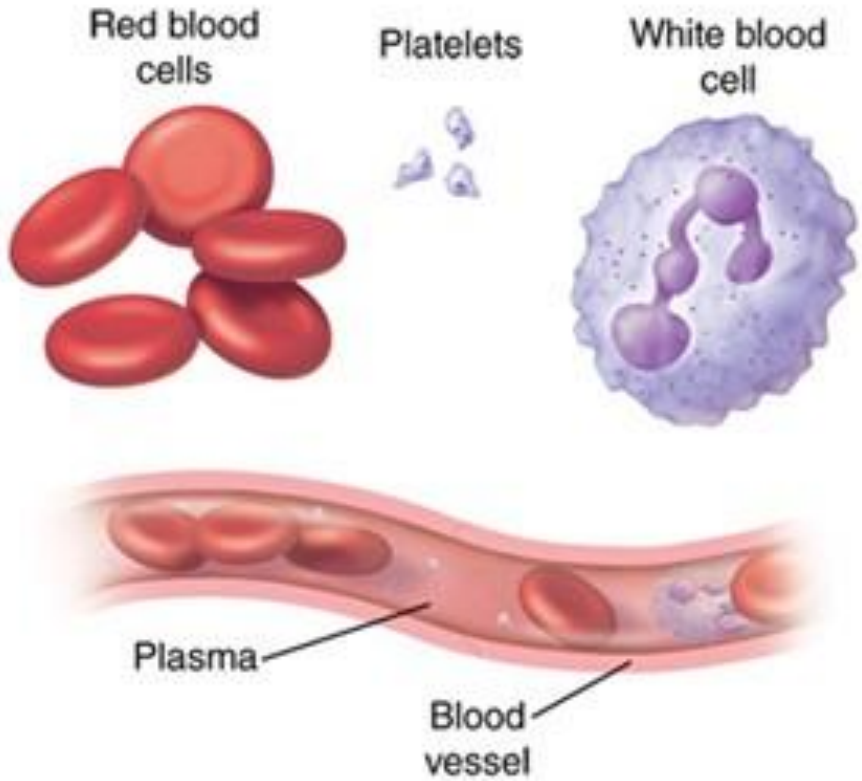
thigmotropism

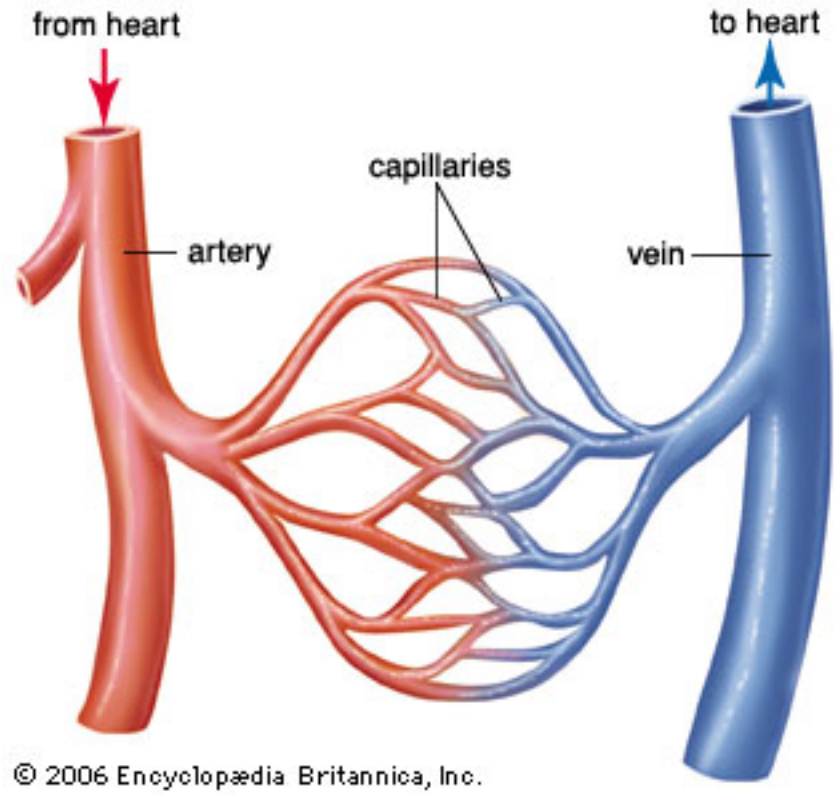


# Digestive system: function of digestive system; path of food; production and function of enzymes

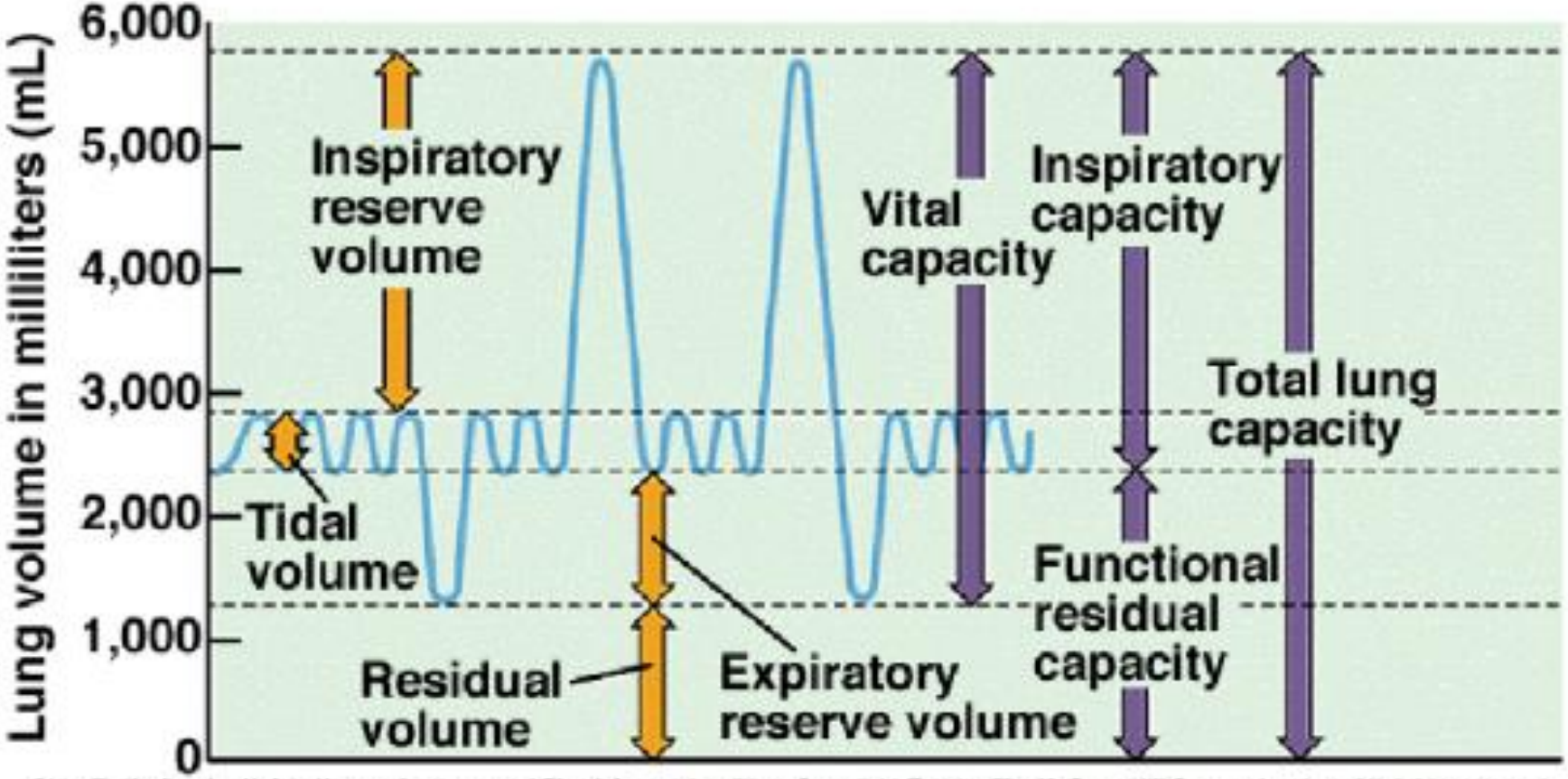


# Circulatory system: components of blood and their functions, blood types, blood vessels, blood pressure



# Respiratory Volumes and Capacities



# Respiratory system: terms for breathing volumes