

# P2 Reprod. Review


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## Reproduction Review

### 1. Cells

- a. Know the basic organelles/structures within cells and what they do.
  - i. Include:
    - cell membrane = "body guard of the cell" lets things into and out of cell
    - cell wall = provides extra structure and support for PLANT CELLS!
    - centriole = produces spindle fibers during mitosis
    - chloroplast = produces food for PLANT CELLS
    - cytoplasm = provides supports for all other organelles inside of cell
    - endoplasmic reticulum = "highway of the cell" transports materials
    - Golgi body(apparatus) = "post office" modifies and packages proteins to leave cell
    - lysosome = break down substances inside of the cell
    - mitochondria = produces energy "powerhouse of the cell"
    - nucleus = "brain of cell" controls the cell's function and contains DNA (chromosomes)
    - ribosome = produce proteins
    - vacuole = store nutrients, waters, other substances...etc.
- b. Know the difference between a plant cell and animal cell.
  - Plant cells have cell walls and chloroplasts, animal cells do not.
  - Animal cells have more mitochondria.

### 2. Cell Division

- a. Cell Theory
  - i. Recognize and understand the 3 main points under the cell theory.
    - 1. Cells are the basic unit of life.
    - 2. Everything living is composed of 1 or more cells.
    - 3. All cells come from pre-existing cells.
- b. Cell cycle
  - i. What is the cell cycle?
    - = the process/cycle that all cells go through (life of a cell)
  - ii. What are the 2 main phases/stages of the cell cycle?
    - Interphase = living, growing, repairing, preparing to divide (replicating DNA)
    - the division phase/stage = cell divides (mitosis and cytokinesis)
  - iii. What is a cell doing for the majority of its life?
    - = It is in interphase: growing, repairing, preparing to divide.
  - iv. Know what *interphase* is, especially the fact that it is separate from the cell division phases.
    - = See above.
- c. Asexual vs Sexual reproduction
  - i. What are similarities and differences of asexual and sexual reproduction?

	Similarities	Differences	
asexual	-Both result in offspring - both utilize mitosis	-done by oneself (no partner required) -offspring is identical to parent -faster than sexual -uses less energy than sexual	
sexual	-Both result offspring -both utilize mitosis	-need a partner -offspring is different from parent -slower than asexual -uses more energy than asexual	

i. What are the advantages and disadvantages of both asexual and sexual reproduction?

	Advantages	Disadvantages
Sexual	-high variation in offspring (genetic variation) -more variety -two parents to support offspring	-takes a lot of time and energy -no guarantee of success -more complex, and more can go wrong)
Asexual	-happens quickly(no wasted time or energy) -survive easily (parent survives, they all survive) -large number of offspring -they stay close together (protection)	-no genetic variation (one gets sick they all do) -lead to overcrowding -little chance for adaptations or evolution

ii. Recognize the following examples of asexual reproduction:

- Binary fission = mitosis, but in bacteria with a single circular chromosome
- budding = production of a small new 'bud' cell (like mitosis, but unequal cells)
- sporulation= producing 1000s of tiny "mini-me's" that can be spread
- fragmentation = regeneration: starting a new organism from a small bit of the old one.
- vegetative propagation= plants only: growing a whole new plant with a part of one (stem, leaf, root, runners, )

d. Cell division – mitosis and cytokinesis

i. What are the 3 main reasons as to why cells divide?

1. Growth
2. Repair
3. Reproduce

ii. Illustrate and explain the 4 different phases of mitosis:

- Prophase = d.s. chromosomes appear, and nuclear membrane disappears
- metaphase = d.s. chromosomes line up at the middle
- anaphase= d.s chromosomes are pulled apart
- telophase= new nuclei form around each set of s.s. chromosomes
- \*\*for illustrations, see notes or flashcards

iii. Understand that the final part of the division phase is cytokinesis, and what occurs during this phase.

= cytoplasm fully splits, and a cell membrane forms around 2 new identical cells

iv. Identify the end result of mitosis (type and number of cells).

= 2 new, identical cells

e. Gamete formation – meiosis

i. What is the purpose of meiosis?= to produce haploid gametes (half the DNA)

What does it produce? = haploid gametes (sperm or eggs)

Where does it occur?= gonads (testes and ovaries)

ii. Illustrate and explain the different phases of meiosis.

Prophase I = chromosome appear, and nuclear membrane disappears

Metaphase I = homologous pairs( 2 d.s. chromosomes) line up at the middle

Anaphase I= homologous pairs get pulled apart

Telophase I= new nuclei form around two sets of half the original DNA

Prophase II=can see the d.s. chromosomes, no nuclear membrane

Metaphase II=d.s. chromosomes line up at middle

Anaphase II=d.s. chromosomes are pulled apart

Telophase II= nuclear membrane forms around each of the sets of chromosomes.

iii. Identify the end result of meiosis (type and number of cells).

we get 4 haploid gamete cells

-they have half the amount of DNA

-sperm cells or egg cells

iv. Compare the processes of mitosis and meiosis.

What are similarities?

= both run through the PMAT stages

=both make new cells

=split up ds chromosomes

What are differences?

=mitosis makes identical cells, meiosis makes different cells

=mitosis makes 2 cells, meiosis makes 4 cells

=mitosis runs through PMAT once, meiosis runs through PMAT twice

=mitosis makes regular body cells in humans, meiosis makes **gametes** (sperm and egg) in humans

### 3. Human Reproductive Systems

#### a. Male reproductive system

- i. Know the overall function of the male reproduction system.  
=produce sperm and then deliver it to the egg.
- ii. Be able to identify and describe the function of the following structures:
  - Bladder=hold urine
  - Cowper's gland=makes semen with the seminal vesicle and the prostate gland
  - epididymis=stores sperm until ejaculation
  - penis=becomes hard to help deliver the sperm to the female
  - prostate gland=makes semen with the Cowper's gland and seminal vesicle.
  - scrotum=holds the testes outside the body to keep them at optimal temperature
  - seminal vesicle=makes semen with Cowper's gland and prostate gland.
  - testes=make sperm and produces testosterone
  - urethra=tube that will deliver the sperm in semen to the female
  - vas deferens=transports sperm from epididymis to the urethra
- iii. Identify the male sex hormone. = testosterone
  - What are its effects on the male reproductive system?  
= sperm production  
=secondary sex characteristics
  - What secondary sex characteristics does it promote?  
=hair growth (beard, chest, back, legs, armpits, pubic)  
=enlarges the Adam's Apple (lower the voice)  
=increases/favours muscle growth

#### b. Female reproductive system

- i. Know the overall function of the female reproduction system.  
=mature eggs in ovaries  
=release the eggs (ovulation)  
=nurture the zygote if it implants  
=grow the embryo, until birth
- ii. Be able to identify and describe the function of the following structures:
  - Bladder=holds urine
  - cervix=muscular opening to the uterus
  - ovary=produce/release mature egg cells, and produces estrogen and progesterone
  - oviduct (fallopian tubes)=transport the egg cell to the uterus; site of fertilization
  - uterus=pear shaped organ that will hold the growing embryo
  - vagina =the opening for menstrual fluid to leave the body, or for a child being born. The location where sperm is deposited
- iii. Identify the female sex hormones.=estrogen and progesterone
  - What are their effects on the female reproductive system?  
=estrogen: secondary sex characteristics, and fluctuations with the endometrium  
=progesterone: fluctuations with the endometrium.
  - What secondary sex characteristics do they promote?  
=hair growth (armpits, pubic, leg)  
=breast growth  
=widening of hips  
=increased fat growth over muscle
- iv. Know what occurs throughout the **menstrual cycle**  
=about 28 day cycle  
=starts with menstruation  
=ovulation occurs midway through  
=ends/starts new cycle with menstruation if no fertilization and implantation occurs
  - Terms to take note of are
    - follicle=the outer shell that protects the maturing egg cell in the ovary; also produces estrogen and progesterone
    - ovulation=a mature egg cell is release from the ovary, and is ready for fertilization (~3-4days)
    - menstruation**=the shedding of the endometrium (~5-7 days)
    - endometrium=the internal lining of the uterus that will nurture a growing embryo
  - Know the approximate length of each stage and the whole cycle
    - =Whole cycle is ~28 days (month)
    - =menstruation ~ 5-7 days (week)
    - =ovulation ~3-4 days

c. Know the stages that occur throughout human development from fertilization to birth

i. Include terms like:

- zygote=single cell, made when the sperm cell fertilizes the egg cell
- sperm=male gamete (23 chromosomes)
- egg=female gamete (23 chromosomes)
- ovulation=when an egg cell is released from an ovary, and ready for fertilization
- fertilization=when a sperm cell's nucleus joins with the nucleus of the egg cell
- implantation=when a zygote connects to the endometrium to begin growing.
- embryo=from implantation to ~9 weeks (when bone forms)
- fetus=from ~9 weeks until birth (bone has formed)
- labour=act of giving birth
- birth=when the fetus exits the uterus via the vagina

ii. Identify what separates an embryo from a fetus.  
=the formation of bone

#### 4. Genetics

a. Know the meaning, and how the following genetic terms relate to each other:

- i. Trait=characteristic that we can visually see on people
- gene=section of DNA on a chromosome that codes(determines) for a trait
- chromosomes=coiled up DNA
- heredity=passing of traits from parents to offspring
- homologous pairs=two versions of the same chromosome (one from mom, one from dad)
- DNA=genetic material that codes for all the traits a human/organism has
- allele=different versions of a gene/trait

b. Know the following basic genetic concepts

i. How many chromosomes are in a human cell? =46

- What is the haploid number?=23(half of the set of chromosomes)
- What is the diploid number?=46 (full set of chromosomes)

ii. Which chromosomes are the sex chromosomes?=X and y

- What combination sex chromosomes codes for the male sex?=Xy
- What combination of sex chromosomes code for the female sex?=XX

iii. How many chromosomes does each parent give to their offspring? =23 (haploid gametes)

iv. Understand the difference between dominant and recessive alleles.

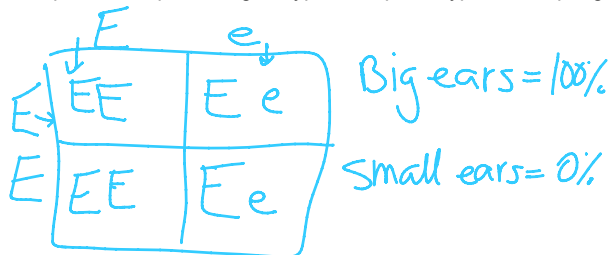
- =**dominant**: this version of the gene/trait will always be visible
- = **recessive**: this version of the gene/trait will be masked, unless there is only recessive alleles present

v. Understand the difference between genotypes and phenotypes

- =**Genotype**: the pair of alleles present for a gene/trait
- =**phenotype**: the physical appearance of what is in the genes
- Understand what genotypes (heterozygous, homozygous dominant, homozygous recessive) will produce a dominant or recessive phenotype
- heterozygous= one dominant, one recessive (Ee): this results in a dominant phenotype
- homozygous dominant= two dominant (EE): this results in a dominant phenotype
- homozygous recessive=two recessive (ee): this results in a recessive phenotype

c. Understand how to use a Punnett square to predict the possible genotypes and phenotypes of offspring.

Example: Big ears  
E= big ears  
e=small ears

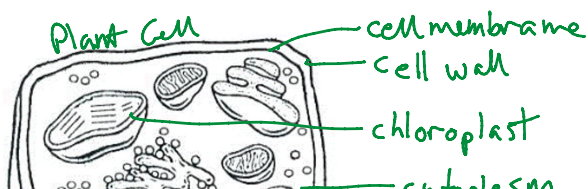


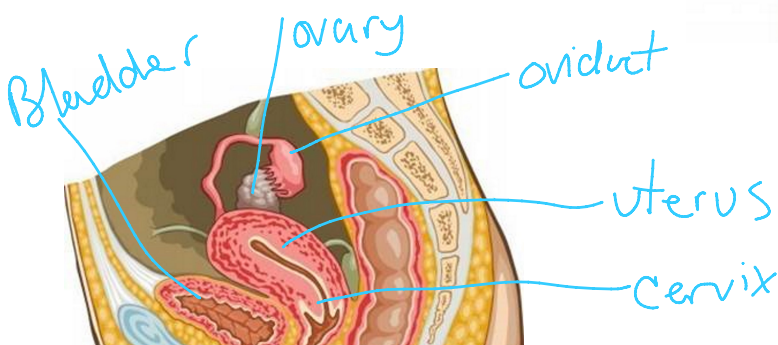
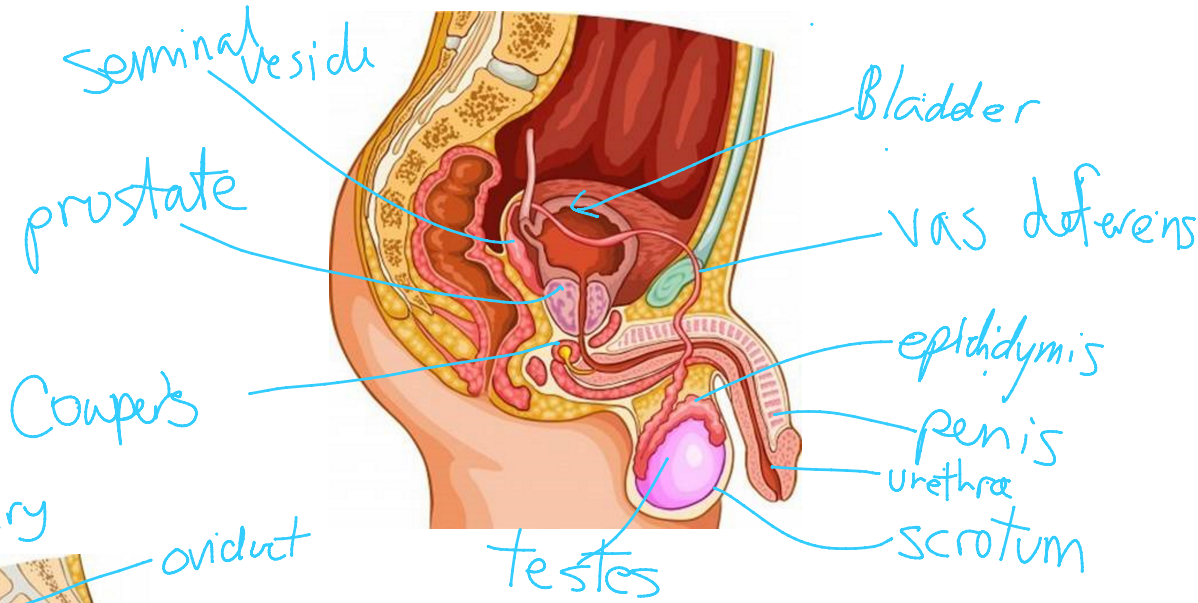
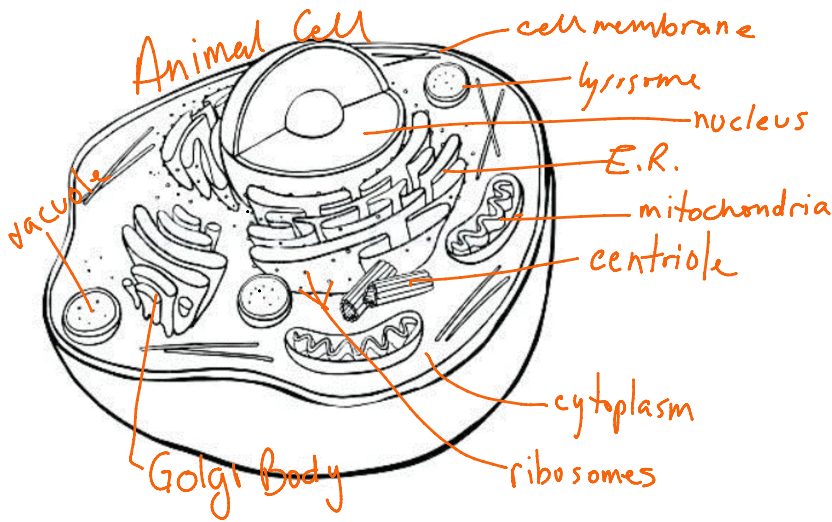
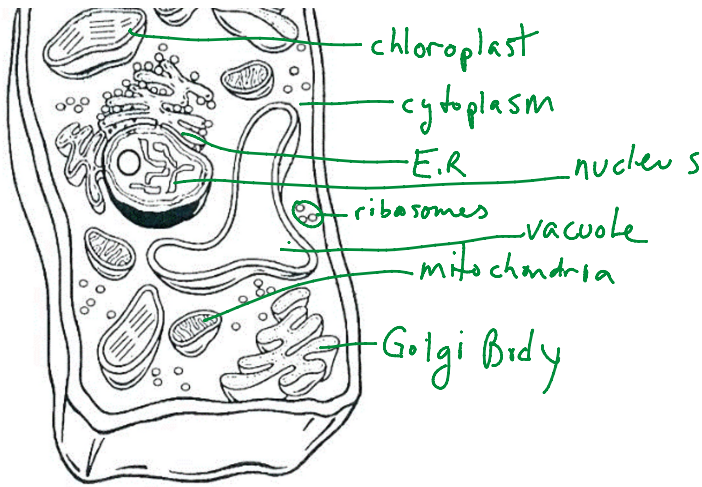
d. Dad=big ear (EE)  
Mom=big ears (Ee)

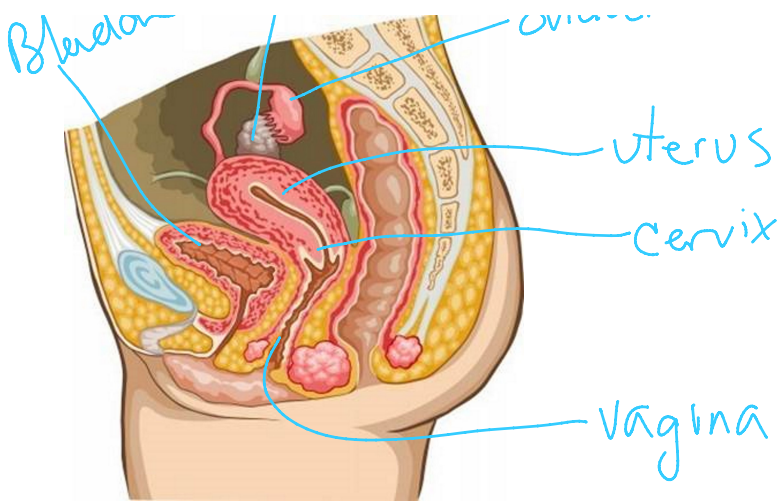
#### Vocabulary

- Allele
- Anaphase
- Asexual reproduction
- Cell cycle
- Chromosomes

- Cytokinesis
- Diploid
- DNA
- Dominant
- Embryo
- Endometrium
- Estrogen
- Fertilization
- Fetus
- Gamete
- Genes
- Genetic diversity
- Genotype
- Haploid
- Heredity
- Heterozygous
- Homologous Pair
- Homozygous
- Hormone
- Interphase
- Mitosis
- Meiosis
- Menstrual cycle
- Menstruation
- Metaphase
- Ovulation
- Phenotype
- Progesterone
- Prophase
- Punnett Square
- Recessive
- Sex-linked trait
- Sexual reproduction
- Telophase
- Testosterone
- Trait
- Zygote







testes

ovary

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