

P5 Reprod. Review

December 3, 2019 9:38 AM

Reproduction Review

1. Cells

a. Know the basic organelles/structures within cells and **what they do**.

i. Include:

cell membrane = protects the cell by controlling what goes in and out of cell "body guard"

cell wall = provides support and protection for **PLANT CELLS!**

centriole = creates spindles fibers during cell division

chloroplast = creates glucose(food) for **PLANT CELLS** by using sunlight

cytoplasm = fluid that fills the cell, supports organelles

endoplasmic reticulum = "highway of the cell" transports molecules

Golgi body(apparatus) = modifies and exports proteins "post office"

lysosome= digests/breaks down molecules

mitochondria= "powerhouse" creates energy

nucleus= "brain" controls the cells functions

ribosome= make proteins

vacuole= stores water, nutrient, etc.

b. Know the difference between a plant cell and animal cell.

<u>Plant cell</u>	<u>Animal cell</u>
-have a cell wall	-do not have cell wall
-plant cells form plants	-animal cells form animals
-have chloroplasts	-do not have chloroplasts
-have one LARGE vacuole	-have a few small vacuoles
-less mitochondria than animal cells	-more mitochondria than plant cells

2. Cell Division

a. Cell Theory

i. Recognize and understand the 3 main points under the cell theory.

1. **all cells come from pre-existing cells**

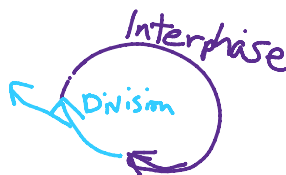
2. cell is the basic unit of life

3. all living organisms are made of one or more cells

b. Cell cycle

i. What is the cell cycle?

= life cycle of a cell



ii. What are the 2 main phases/stages of the cell cycle?

-interphase = cell living its life

-division phase = mitosis + cytokinesis

iii. What is a cell doing for the majority of its life?

-It is in interphase

-growing

-repairing

-preparing to divide (replicating its DNA)

-carrying out cell functions

- 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?

	Asexual Reproduction	Sexual Reproduction
Similarities	-produce offspring	-produce offspring
Differences	-only need one organism -large number offspring -offspring are clones or identical to parents	-need two organisms -less offspring at a time -offspring are genetically different from parents

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

	Asexual Reproduction	Sexual Reproduction
Advantages (positives)	-can reproduce fast -no need to waste time finding a partner -higher chance of success because the offspring is identical to parent! -stay close together (protection)	-there is lots of genetic variation -organisms can adapt easier -two parents to take care of the offspring
Disadvantage (negatives)	-no genetic variation: a disease could kill all very quickly -little possibility for adaptations or evolution -can lead to overcrowding	-need two parents which means more time to find the partner -complicated, which means more can go wrong -no guarantee of success -takes more energy

- iii. Recognize the following examples of asexual reproduction:

- Binary fission = like mitosis, but in bacteria (because bacteria have a single, circular chromosome)
- budding= the new cell is a little 'bud' which means it is a lot smaller than the original
- sporulation= production of spores (like 1000s of little "mini-me's" to be released and grow later)
- fragmentation= (aka regeneration) a new organism growing from a piece of an existing one
- vegetative propagation= growth of a new plant from a piece of an existing plant (stem, leaf, root, runner, etc)

d. Cell division – mitosis and cytokinesis

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

1. growth
2. repair
3. reproduction

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

- Prophase = chromosomes are visible, nuclear membrane disappears
- metaphase= ds chromosomes line up at the middle of the cell
- anaphase= ds chromosomes are pulled apart
- telophase= nuclear membrane forms around ss chromosomes (new nuclei)

****See notes or flashcards for phase pictures.**

- iii. Understand that the final part of the division phase is **cytokinesis**, and what occurs during this phase. = **the cytoplasm splits, and new cell membranes form**
- iv. Identify the end result of mitosis (type and number of cells).
You get 2 identical cells. (same number of chromosomes)

e. Gamete formation – meiosis

- i. What is the purpose of meiosis? **To produce haploid gametes (cells with half of DNA)**
What does it produce? **Gametes (sperm or egg)**
Where does it occur? **gonads (testes or ovaries)**
- ii. Illustrate and explain the different phases of meiosis.
Prophase I=chromosomes appear, nuclear membrane disappears.
metaphase I=homologous pairs (2 ds chromosomes) line up at the middle
anaphase I=homologous pairs are pulled apart
telophase I=two new nuclei, with half of the original DNA

Prophase II=chromosomes appear, nuclear membrane disappears
metaphase II=ds chromosomes line up at the middle
anaphase II=ds chromosomes are pulled apart
telophase II= 4 new nuclei are formed, each with half of the original DNA (ss chromosomes)
****See notes and flashcards for pictures**
- iii. Identify the end result of meiosis (type and number of cells).
We get 4 haploid gametes
-half the DNA of original cell
-sperm or egg cells
- iv. Compare the processes of mitosis and meiosis. What are similarities? What are differences?
-similarities: both for reproduction
:both happen to cells
:both involve splitting replicated DNA (ds chromosomes)
:both use the PMAT stages!!!
: both start with one cell
-differences: mitosis ends with 2 cells (identical), meiosis ends with 4 cells (genetically different)
:mitosis goes through PMAT once, meiosis goes through PMAT twice
:mitosis occurs with all normal human body cells, meiosis only occurs with human gametes(sperm and egg)
:mitosis the cells have the same number of chromosomes, meiosis the cells made have half the number of chromosomes

3. Human Reproductive Systems

a. Male reproductive system

- i. Know the overall function of the male reproduction system.
-produce sperm, and then to deliver sperm
- ii. Be able to identify and describe the function of the following structures:
 - **Bladder-holds urine**
 - Cowper's gland-produces semen with the prostate gland and seminal vesicle**
 - epididymis-stores sperm until ejaculation**
 - penis-delivers sperm in semen to the female**
 - prostate gland-produces semen with Cowper's gland and seminal vesicle**
 - scrotum-holds the testes outside of body, in prime temperature**
 - seminal vesicle-produces semen with the Cowper's gland and prostate gland**
 - testes-male gonad, produce sperm and testosterone**
 - urethra-transport the sperm in semen from prostate out of the penis**
 - vas deferens-transport sperm from the epididymis to the urethra**

iii. Identify the male sex hormone.-testosterone

- What are its effects on the male reproductive system?
 - starts sperm production
 - responsible for the male secondary sex characteristics
- What secondary sex characteristics does it promote?
 - hair growth (beard, chest, pubic, armpit hair, other body hair)
 - enlargement of the Adam's apple (lowers voice)
 - promotes muscle growth over fat growth

b. Female reproductive system

i. Know the overall function of the female reproduction system.

- mature egg cells in ovary
- release the mature egg cell
- if implantation occurs, nurture the developing embryo
- give birth

ii. Be able to identify and describe the function of the following structures:

- Bladder-hold/stores urine
- cervix-muscular opening to the uterus
- ovary-holds maturing egg in the follicle until it's released
- oviduct (fallopian tubes)-connects the ovary to the uterus
- uterus- if implantation occurs, it will hold the developing embryo
- vagina- it's the opening to allow sperm into the female reproductive system, or to allow menstrual fluid or a developed fetus out.

iii. Identify the female sex hormones. -estrogen and progesterone (produced in ovary from follicle)

- What are their effects on the female reproductive system?
 - progesterone**: helps maintain the endometrium
 - estrogen**: helps produce and maintain the endometrium, and is responsible for secondary sex characteristics
- What secondary sex characteristics do they promote?
 - hair growth (armpit, legs, pubic hair)
 - development of breasts
 - widening the hips
 - promotes the growth of fat over muscle

iv. Know what occurs throughout the **menstrual cycle**

- ~ 28 days (month)
- includes **menstruation** and ovulation
- Terms to take note of are
 - follicle-protective 'shell' that surrounds the egg in the ovary.
 - responsible for estrogen and progesterone fluctuations
 - ovulation-when the mature egg is released from the ovary
 - ~3-4 days in the middle of the menstrual cycle
 - menstruation-the shedding of the endometrial lining
 - ~5-7 at the beginning/end (start of menstruation means a new cycle is starting)
 - endometrium-the inner lining of the uterus
- Know the approximate length of each stage and the whole cycle
 - ~5-7 days (week) of menstruation
 - ~7 days (week) with the increase of estrogen
 - ~3-4 days of ovulation (progesterone increase as well)
 - ~7-10 days (week) with maintenance of hormones.
 - Once hormones drop, menstruation occurs again.

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

- i. Include terms like:
 - zygote-new cell that forms when the **nuclei fuse** from a sperm and egg cell
 - nuclei fuse = once the two haploid nuclei form one diploid nucleus
 - sperm-male haploid gamete
 - egg-female haploid gamete
 - ovulation-when the mature egg cell is released from the ovary into the oviduct
 - ready for fertilization!
 - fertilization-when a sperm cell meets an egg cell, and the join nuclei
 - implantation-fertilized egg cell reaches the uterus, and latches onto the endometrium
 - embryo-implanted egg cell, until ~9 weeks
 - fetus-from ~9 weeks until fully developed (birth around 9 months)
 - labour- active act of giving birth
 - birth-the exit of the fetus from the uterus, via the vagina
- ii. Identify what separates an embryo from a fetus.
 - when bone develops, it is called a fetus (embryos do not have bone)

4. Genetics

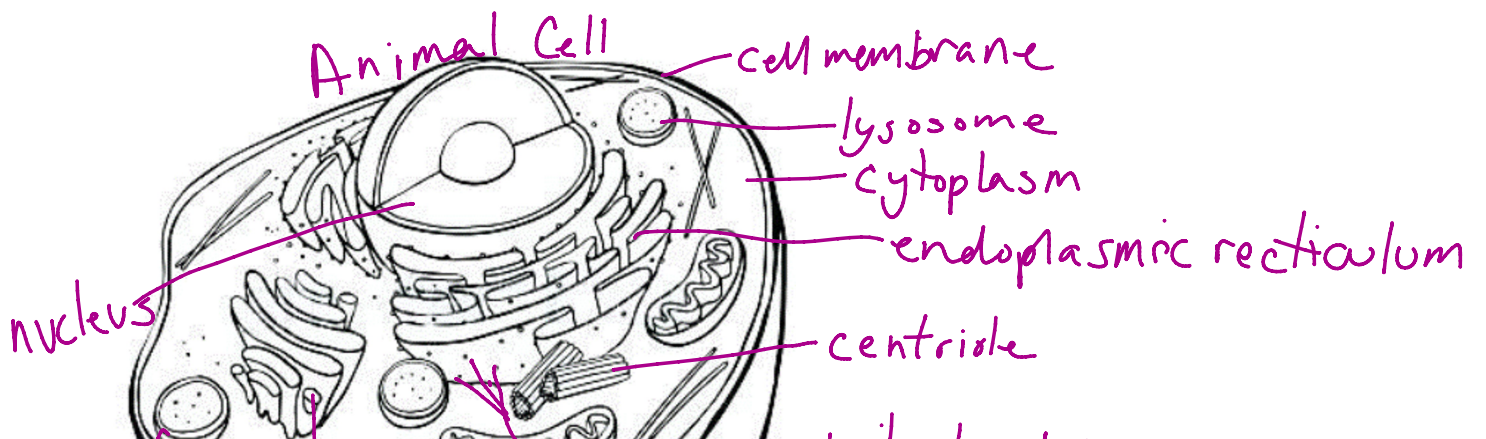
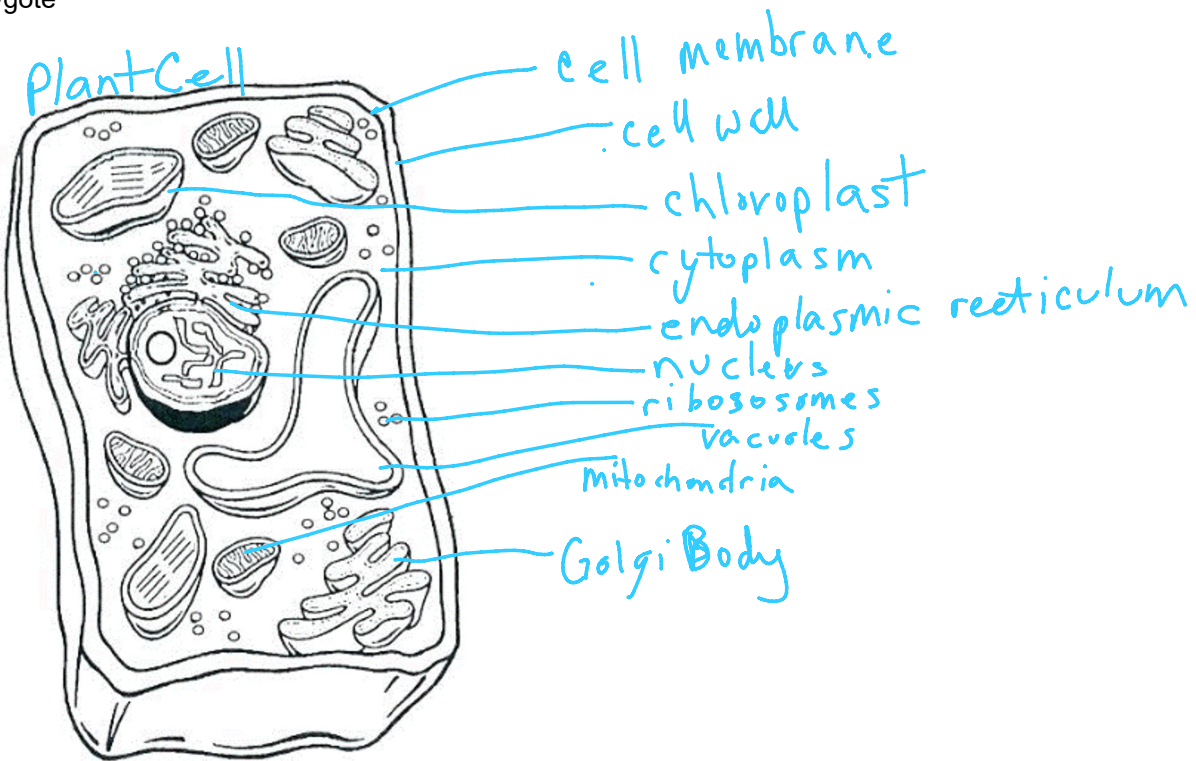
- a. Know the meaning, and how the following genetic terms relate to each other:
 - i. Trait-characteristic (ex: hair colour, eye colour, height)
 - gene-located on chromosome, and code for traits
 - chromosomes- coiled up DNA
 - heredity-passing of genetic material from parents to offspring
 - homologous pairs-two ds chromosomes, pairing up based on genes
 - one is from mom, one is from dad
 - DNA-genetic material that codes for traits an **organism** displays
 - allele-versions of genes/traits
 - two versions, one on each homologous pair
- b. Know the following basic genetic concepts
 - i. How many chromosomes are in a human cell? -46
 - What is the haploid number?-23(half set)
 - What is the diploid number?-46 (full set)
 - 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
 - iv. Understand the difference between dominant and recessive alleles.
 - dominant**: this version of the trait will always be displayed if the allele is present.
 - recessive**: this version of the trait will only be displayed if there is no other allele present.
 - **Dominant will hide recessive!!!
 - v. Understand the difference between genotypes and phenotypes
 - genotype**: the alleles present for a gene (two letters)
 - phenotype**: the appearance that is produced by the genes
 - Understand what genotypes (heterozygous, homozygous dominant, homozygous recessive) will produce a dominant or recessive phenotype
 - Heterozygous: two different alleles (Ee) - display dominant phenotype
 - Homozygous dom.:two dominant alleles (EE) - display dominant phenotype
 - homozygous rec.: two recessive alleles (ee) - display recessive phenotype

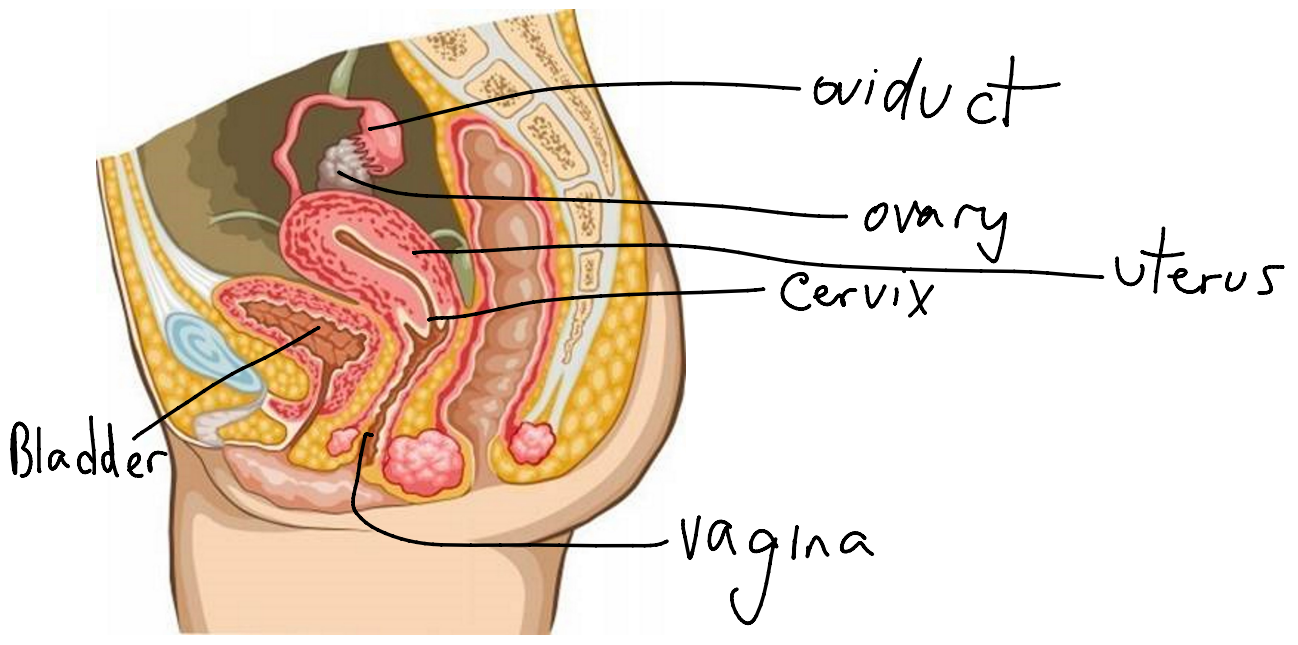
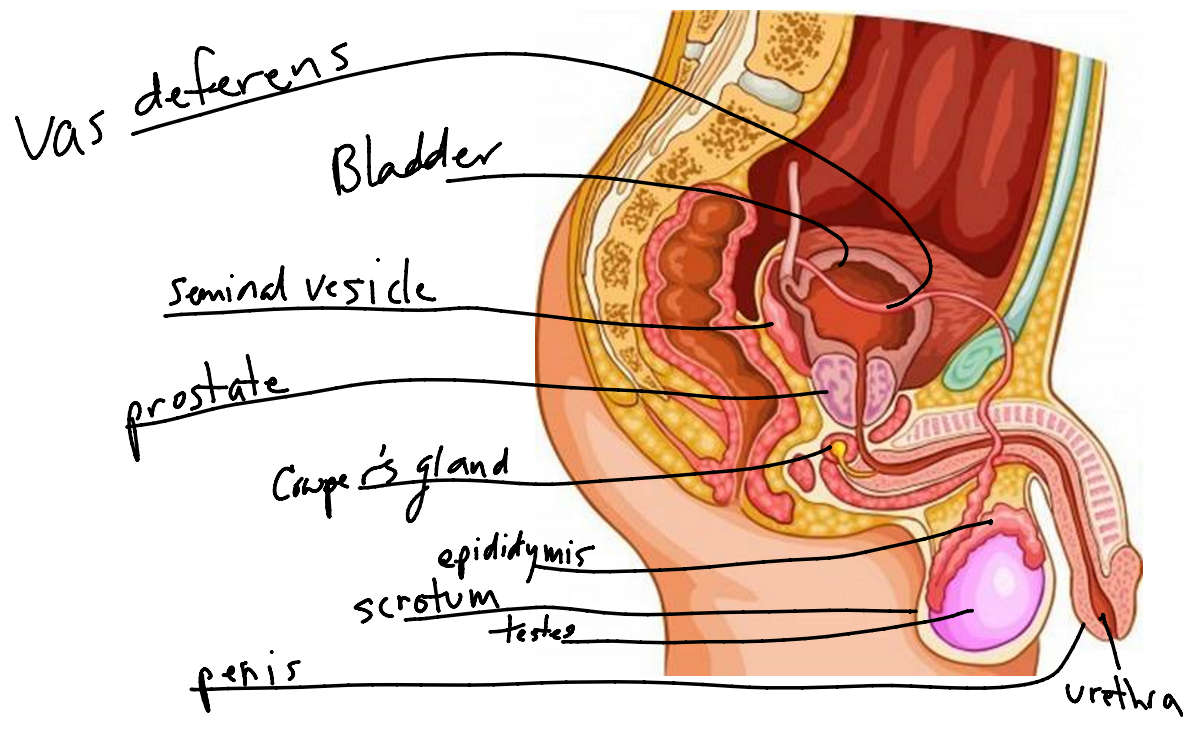
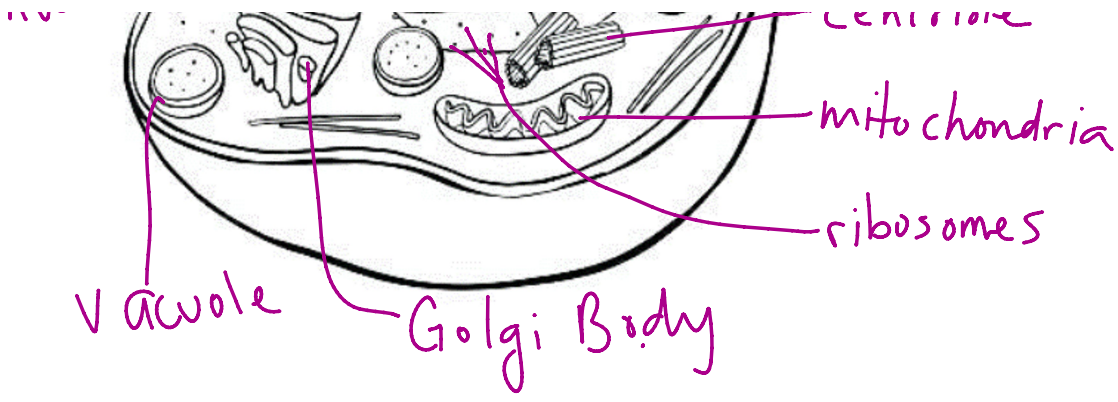
c. Understand how to use a Punnett square to predict the possible genotypes and phenotypes of offspring.

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





From <https://gvsd-my.sharepoint.com/personal/laura_kalyta_gvsd_ca/Documents/Documents/Science%2010F/02%20-%20Reproduction/Assessment/Reproduction%20Review_Topics%20on%20Test.docx>