KEY

7th Grade Life Science Midterm Review

1. **Safety**:
   a. What do you do if you don't understand directions for a lab? ASK Teacher!

   b. List some things you are NEVER allowed to do in the lab.
   - Horseplay
   - Throw things
   - Run
   - Eat or Drink

   c. What are the three PPE (Personal Protective Equipment) items?
   Gloves, goggles, apron

2. **KFS**
   a. Convert 3.28 feet to kilometers (3.28 ft = 1 m)

K: 3.28ft = 1m; have 3.28ft; 1000m = 1km

F: ? km = 3.28ft

S: $\frac{3.28ft}{1} \times \frac{1m}{3.28ft} \times \frac{1km}{1000m} = 0.001km$

3. **Scientific Method**:
A scientist wants to investigate how different amounts of water affect the growth rate of plants. She takes five pots and puts a pea plant in each pot. She gives one pea plant 5 ml of water each day, she gives one 10 ml each day, she gives another 15 ml each day ... etc. Every two days she measures the height of each plant.
   a. Independent variable: Amount of water

   b. Dependent variable: Height of peaplant

   c. Control variables (2): pot, type of plant, type of soil, amout of light exposure, etc.

What was the impact of Redi and Pasteur's experiments?
Their experiments rejected the idea that living things came from nonliving matter (Spontaneous Generation).

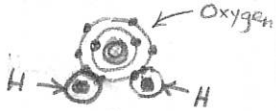
4. **Microscopes**
   a. Describe how you would use the course focus, fine focus, and objective lenses on the microscope to increase resolution and/or magnification of an image.
First, use the course focus to adjust the stage. This brings sample into view. (use lowest objective 1st.) Then, increase the resolution of the image of the sample by adjusting the fine focus, this will make fine details more visible.

   b. How do you calculate total magnification for an image?
Multiply the magnification of the ocular lens by the magnification of the objective lens.
Ex. Ocular lens: 10x
Objective lens: 40x
Total Magnification: 10x40=400x

5. **Chemistry/Biomolecules:**

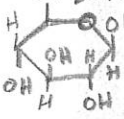
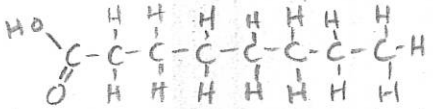
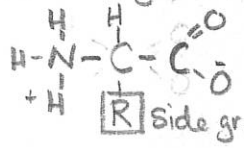
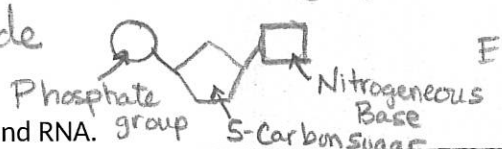
a. What is a covalent bond? It is a bond between to atoms that are sharing valence electrons. ("outermost")

Ex: H_2O



b. What is an ionic bond? It is a bond formed by the attraction of two oppositely charged ions. Ex: $Na^+ + Cl^- \rightarrow NaCl$

c. List the four biomolecules and their monomers.

Biomolecule	Monomer	Draw!	Give Examples
Carbohydrate	→ monosaccharide (*Always ring structures)		Ex: Glucose, fructose, cellulose, chitin
lipid	→ fatty acid		Ex. Glycerol bonds to 3 fatty acid chains to form triglyceride.
protein	→ amino acid		Ex. Collagen, Keratin, insulin
Nucleic acids	→ Nucleotide		Ex. DNA RNA

d. Fill in the chart with the differences between DNA and RNA.

Category	DNA	RNA
Single/Double stranded?	Double	Single
Type of Sugar	Deoxyribose	ribose
Nitrogenous base pairings	A = T G = C	A = U T = A G = C
Located in which part of the cell?	Nucleus	Nucleus, ER, & Cytoplasm

6. **Cells**

a. What are three structures that are in plant cells that are NOT in animal cells?

- Cell wall
- chloroplast
- central vacuole

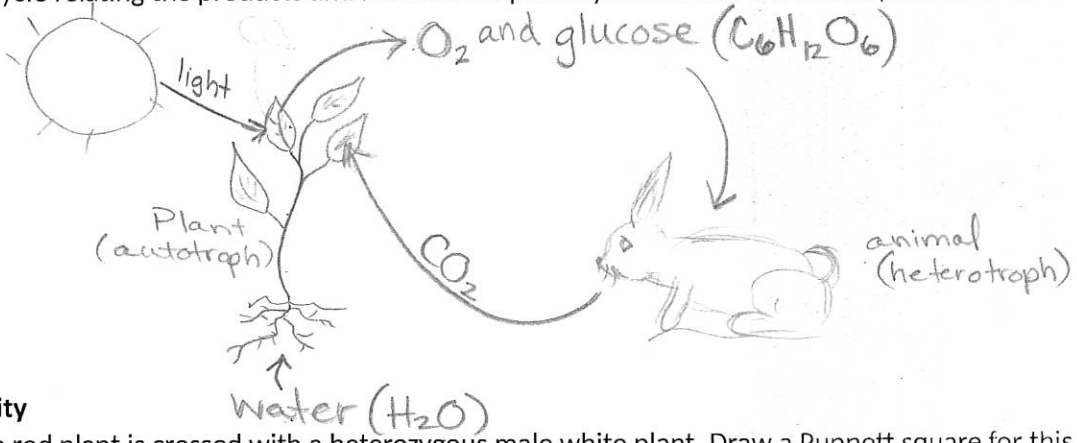
b. What is the primary biomolecule that makes up the cell membrane of plant and animal cells? What type of biomolecule is this?

It is made up of lipids called phospholipids.

c. What is the primary biomolecule that makes up the cell wall of plant cells? What type of biomolecule is this?

The cell wall is primarily composed of cellulose, which is a carbohydrate.

d. Draw a cycle relating the products and reactants of photosynthesis and cellular respiration to each other.



7. Genetics/Heredity

a. A female red plant is crossed with a heterozygous male white plant. Draw a Punnett square for this cross. Write the phenotypic and genotypic ratios of the offspring outcomes for this cross.

(Rr)
Male: Heterozygous = white phenotype is dominant, let R = white and r = red
Female: Must be homozygous recessive (rr)

	R	r
r	Rr	rr
r	Rr	rr

Percent: 50%/50%

Genotypic Ratios: 1Rr : 1rr

Phenotypic Ratio: 1 White : 1 red
50% : 50%

b. One cat carries heterozygous, long-haired traits (L), and its mate carries homozygous short-haired traits (l). Use a Punnett square to determine the probability of one of their offspring having long hair.

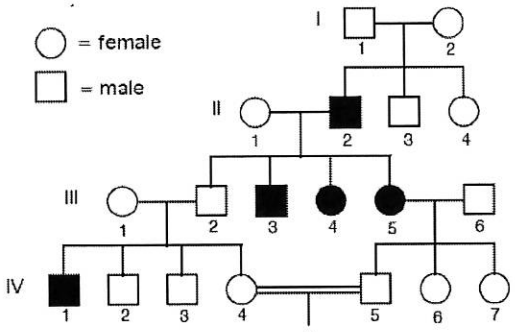
	L	l
l	Ll	ll
l	Ll	ll

same ratios as above.
50% chance of offspring having long hair.

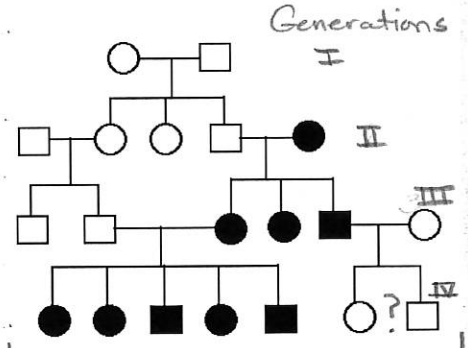
c. What are some examples of recessive, dominant, and sex-linked genetic traits or disorders?

Recessive	Dominant	sex-linked
cystic fibrosis	Huntington's disease	colorblindness
Sickle-cell anemia	Von Willebrand's Disease	hemophilia
tay-sachs disease		

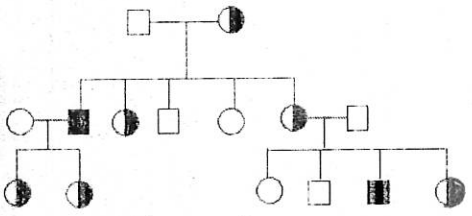
d. What can be determined from each of the following pedigrees?



Recessive allele:
Parents I1 + I2 had to be heterozygous.
Trait does not always appear.
* This pedigree is not showing carriers, just people who have the disorder/trait.



Dominant allele:
High probability of it being passed down.
* All children of (right) Gen II couple have it and all children of (left) Gen III couple have it.
* Questioning: Right Gen IV ?



X-linked / Sex-linked:
* Female carriers
* Males w/ condition
* No females w/ condition

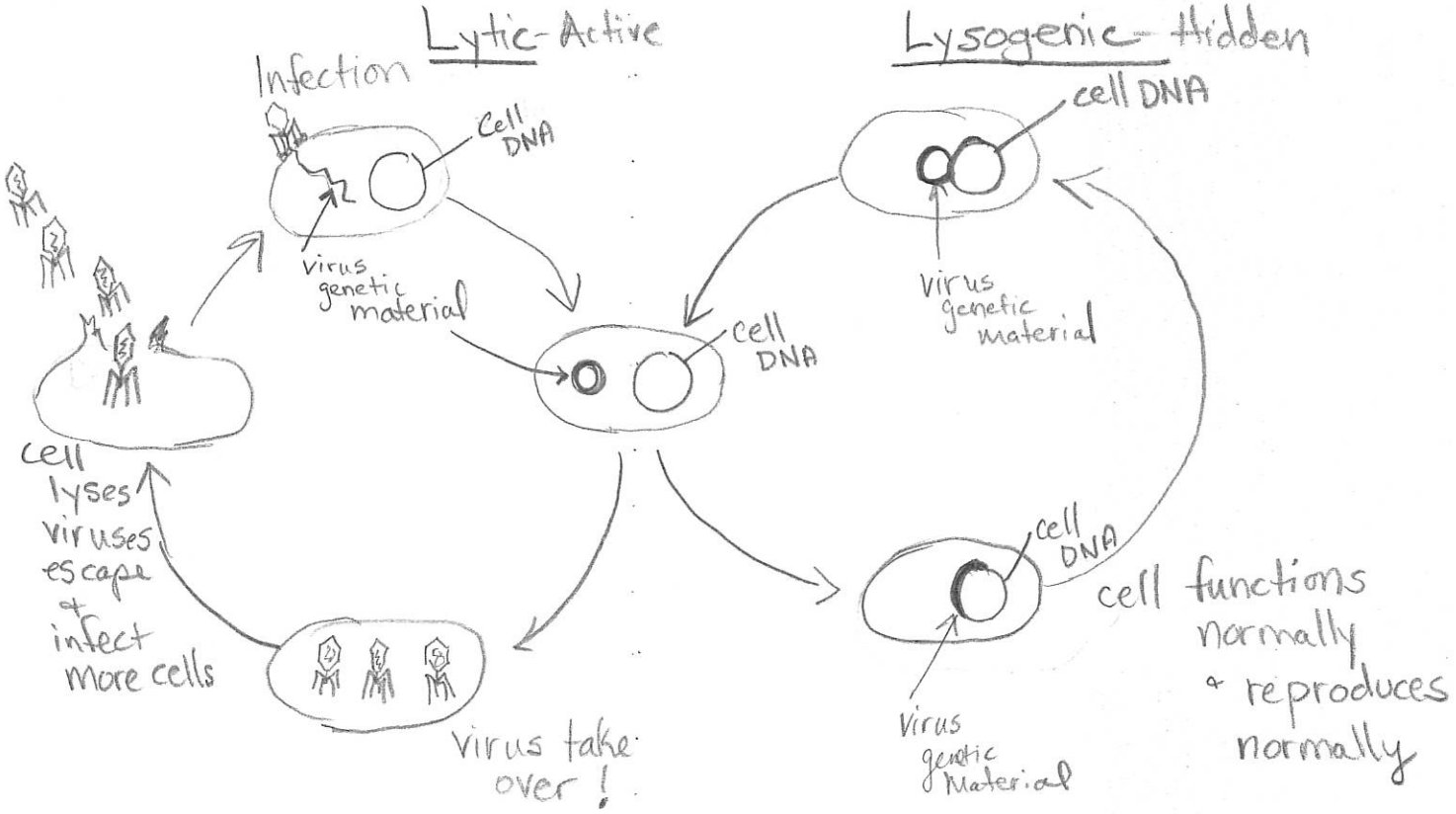
8. Viruses

a. What are the two main components of viruses?

Genetic material surrounded by a protein coat

b. Draw a simple picture of a virus:

c. Draw the lytic and lysogenic viral reproductive cycles.



9. Protists

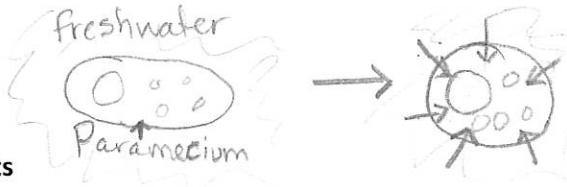
a. List the characteristics of organisms in the Protista kingdom.

- Multicellular or Unicellular
- Eukaryotic cells
- Autotrophic or heterotrophic

b. Describe the function of the contractile vacuole.

Regulate water in cell.

c. Describe how water molecules will move in **osmosis** if a paramecium lives in freshwater.



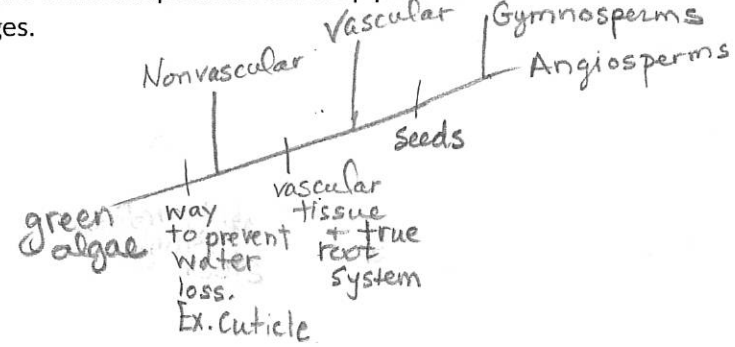
water in cell would move by osmosis into the cell. Cell swells. This is a hypotonic solution.

10. Plants

a. Describe how water and nutrients and food move in a vascular plant. Include the vascular tissue involved as well as the direction the substances move in. Include what structure in a vascular plant takes up water for the plant.

water + nutrients move from roots to leaves through a vascular tube called xylem. Sugars made by photosynthesis move from leaves to roots via the phloem.

b. Describe some adaptations that help plants live on land. Draw a cladogram showing these evolutionary changes.



c. Label the parts of the following flower:

i. What are the male and female reproductive structures?

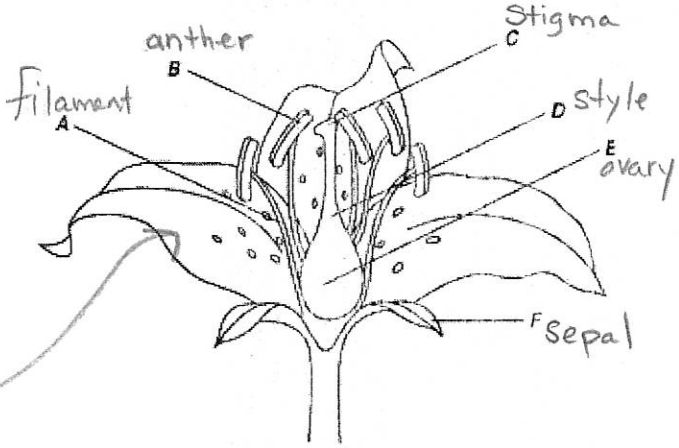
Stamen + pistil
A+B C, D, E

ii. Where does the pollen attach for fertilization?

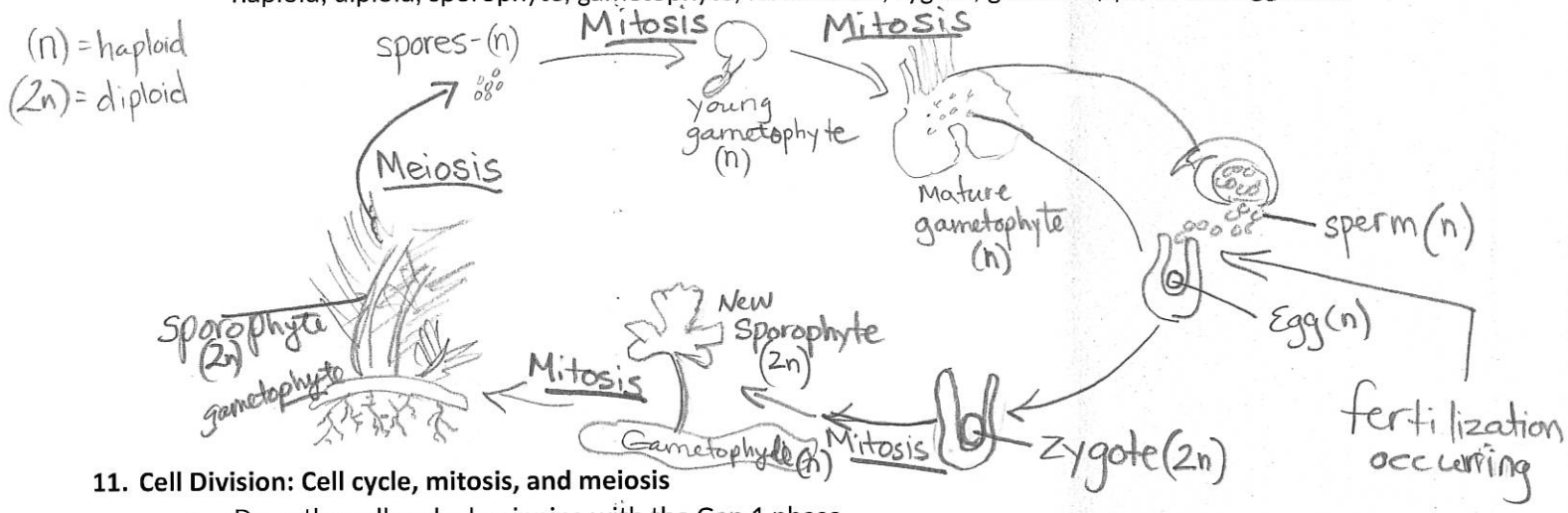
C, the stigma

iii. What part of the flower are pollinators attracted to?

Petals

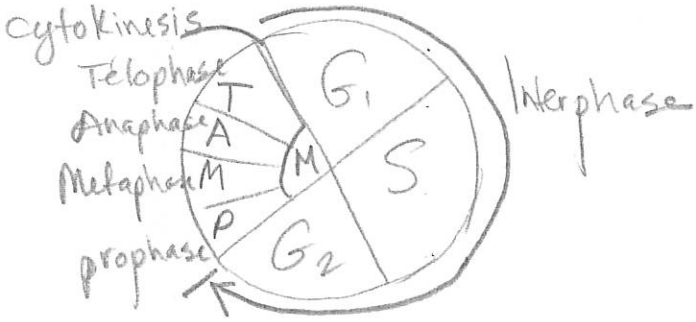


d. Draw the simplified diagram of the life cycle for a seedless plant. Be sure to include: mitosis, meiosis, haploid, diploid, sporophyte, gametophyte, fertilization, zygote, gametes (sperm and egg cells).

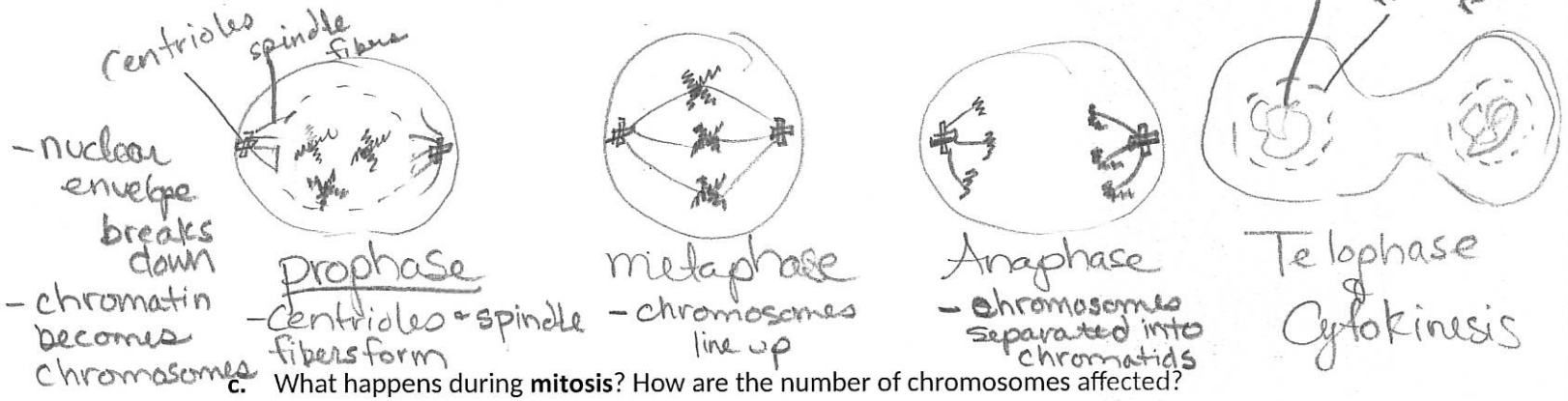


11. Cell Division: Cell cycle, mitosis, and meiosis

a. Draw the cell cycle, beginning with the Gap 1 phase.



b. Draw and describe the phases of **mitosis** starting with Interphase.



c. What happens during **mitosis**? How are the number of chromosomes affected?

Parent cell copies all cell material + then divides equally. This makes 2 daughter cells that are identical to original parent cell and to each other. (1 cell divides + becomes 2 identical cells)

d. What happens during **meiosis?** How are the number of chromosomes affected?

Parent cell copies all cell material + then goes through 2 cell divisions. Chromosomes exchange segments of DNA during Prophase I, this is one of many reasons that resulting cells are genetically unique.

1 cell divides 2x, and produces 4 genetically unique haploid cells (called gametes ie. sperm or eggs)