

# Science 9 Final Exam Review

Key.

## Atoms & Elements

1. What do the following household hazardous symbols stand for?



corrosive    flammable    explosive    poison

2. Identify the following WHMIS symbols:



compressed gas    flammable    oxidizing    pois./inf. - immediate toxic



other toxic

poison/inf.    biohazardous    corrosive    reactive

4. Are the following examples of a physical or chemical change? Explain why.

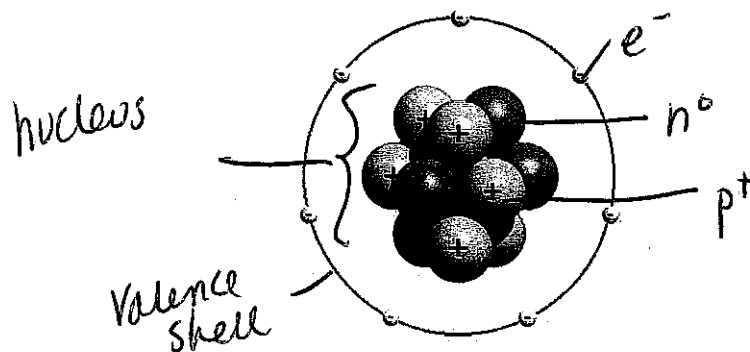
- a) Baking a cake    P or C? can't reverse; new properties
- b) Breaking a glass    P or C? still glass
- c) Dissolving sugar in coffee    P or C? can be separated; same properties
- d) Cement drying    P or C? can't reverse; new substance

5. In each group below, three of the substances belong to the same category of matter (element, compound, mechanical mixture or solution) and one does not. **Circle the substance that does not belong and list why it is different from the others.**

- a) Sea water, kool-aid, air, chlorine  
/ element  
(chlorine)
- b) Bromine, gold, silver, salt  
(salt) - compound
- c) Angel food cake, water, mixed nuts, raisin bran  
(water)  
Comp.

Solutions  
elements  
mech. mix.

6. Label the nucleus, protons, neutrons, electrons and valence shell on the following diagram of an atom:



7. What is wrong with the following chemical symbols and formulas?

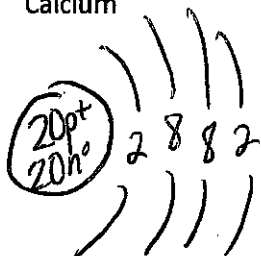
- a) ~~(a)~~ Au  
 b) ~~(Ag)~~ Ag  
 c) ~~(Na<sup>2</sup>SO<sup>4</sup>)~~ Na<sub>2</sub>SO<sub>4</sub>  
 d) ~~(Mg<sub>1</sub>Cl<sub>2</sub>)~~ MgCl<sub>2</sub>

8. Write the proper chemical formula for a compound that has 2 hydrogen, 1 carbon and 3 oxygen (in that order).

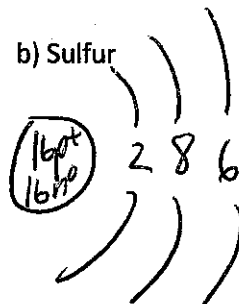


9. Draw the Bohr-Rutherford diagram for:

- a) Calcium



- b) Sulfur



10. Refer to the above diagrams for the following questions:

- a) What noble gas has the closest atomic number to Calcium and Sulfur?

Ar

- b) In order to make a stable ion, which of the above would lose an electron(s) and which would gain an electron(s)?

Ca would lose / S would gain

- c) How many would each lose/gain?

2 each

- d) What charge does a Calcium ion have?

Ca<sup>2+</sup>

- e) What charge does a Sulfur ion have?

S<sup>2-</sup>

11. Fill in the following table:

Atom/Ion/ Isotope	Atomic Mass	Atomic Number	Standard Atomic Notation	Number of protons	Number of electrons	Charge	Number of neutrons
Atom	23	11	<sup>23</sup> <sub>11</sub> Na	11	11	0	$23 - 11 = 12$
ion	35	17	<sup>35</sup> <sub>17</sub> Cl <sup>1-</sup>	17	18	1-	$35 - 17 = 18$
isotope	90	38	<sup>90</sup> <sub>38</sub> Sr	38	38	0	$90 - 38 = 52$

12. Match the following terms with their definition:

- 8 Qualitative observation
- 7 Quantitative observation
- 12 malleability
- 13 ductility
- 14 viscosity
- 11 luster
- 15 solid
- 17 liquid
- 16 gas
- 18 physical change
- 19 chemical change
- 21 evaporation
- 22 condensation
- 20 sublimation
- 23 solution
- 24 mechanical mixture
- 25 pure substance
- 4 proton
- 5 neutron
- 6 electron
- 1 atom
- 2 ion
- 3 isotope
- 9 period
- 10 group

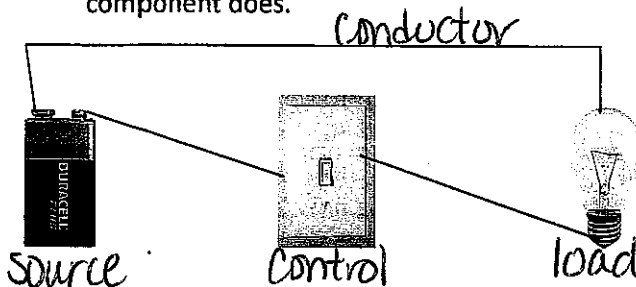
1. A particle in an element. Has equal numbers of p<sup>+</sup>'s and e<sup>-</sup>'s
2. An atom that has gained or lost an electron.
3. An atom of the same element with a different number of n<sup>0</sup>'s
4. A particle in the nucleus of an atom with a positive charge.
5. A particle in the nucleus of an atom with no charge.
6. A particle circling the nucleus of an atom with a negative charge.
7. An observation that looks at measurements.
8. An observation that looks at visible properties (descriptions)
9. A row on the periodic table (left to right)
10. A column on the periodic table (up and down)
11. A physical property describing how shiny a substance is.
12. A physical property describing how bendable a substance is.
13. A physical property that allows a solid to be pulled into wires.
14. A physical property of a liquid that limits its ability to flow.
15. Matter that has a definite shape and takes up a definite amount of space.
16. Matter that does not have a definite shape and does not take up a definite amount of space.
17. Matter that does not have a definite shape but does take up a definite amount of space.
18. A change in where no new matter is created.
19. A change in where new matter is created.
20. A change in state from solid to gas or gas to solid.
21. A change in state from liquid to gas.
22. A change in state from gas to liquid.
23. A homogeneous mixture (looks the same throughout)
24. A mixture where you can see its different parts.
25. A substance that contains only one kind of particle.

## Electricity

- What are the 3 laws of electric charge?
  - opposite charges attract
  - like charges repel
  - Charged objects attract neutral objects
- What are the 3 methods of charging an object?
  - friction (rubbing)
  - contact (touching)
  - induction (no direct contact)
- State whether the following are conductors, insulators or resistors:
  - Copper - C
  - Salt water - C
  - Rubber - I
  - Nichrome - R
  - Tungsten - R

4. What has MORE resistance: a short thick wire or a long, thin wire?

5. Label the 4 components of an electrical circuit (Conductor, source, load, control). List what each component does.



<p>Conductor: allows <math>e^-</math> to flow</p> <p>Source: produces the electricity</p> <p>Load: uses the electricity + converts it to another form of energy (ex light, movement)</p> <p>Control: turns the circuit on + off.</p>
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6. When comparing series and parallel circuits:

a) What is the difference in how they LOOK?

Series = 1 path      parallel = > 1 path

b) What is the difference in the amount of current drawn from the cell when there are numerous light bulbs connected to the circuit?

series: current is shared      parallel: more current is drawn from cells.

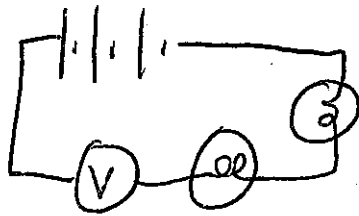
c) What is the difference in the brightness of bulbs when there are numerous light bulbs connected to the circuit?

Series = dim      parallel = stay bright

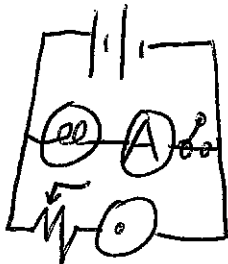
d) What happens if one light bulb is broken in each of the circuits?

series = none work      parallel = others still work

7. Draw a series circuit with 3 cells, a voltmeter, and 2 bulbs.



8. Draw a parallel circuit with 2 cells, a bulb and ammeter in one of the circuits and a variable resistor and a motor in the second circuit. Put in a switch that will only affect the bulb and ammeter.



9. Use the diagram below to answer the following questions:

a) Is this circuit in series or parallel?

b) How many cells are in the circuit?

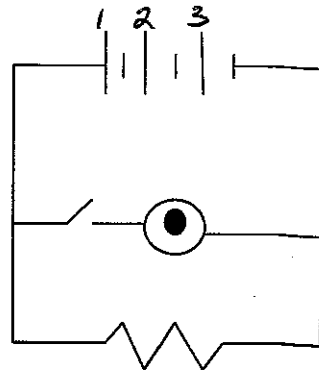
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c) List all the devices in the circuit.

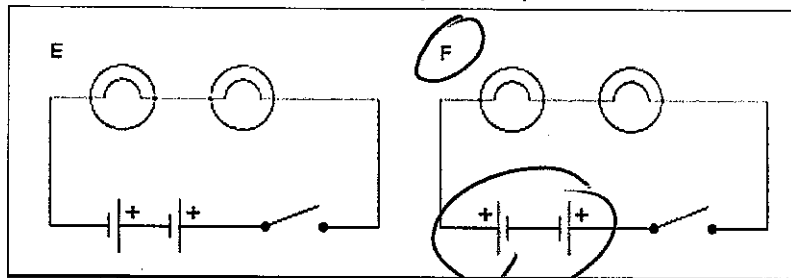
Switch, motor, resistor

d) What device(s) does the switch in the circuit control?

motor



10. Which of the diagrams below does NOT work? Explain why.



cells are not joined properly

11. Name 3 magnetic metals.

1) Iron                      3) Cobalt  
2) Nickel

12. What is in the core of the earth that makes a compass point north?

Iron + nickel → magnetic

13. What could you add to a circuit to make the lamp in it go brighter OR dimmer?

Variable resistor

14. What could you add to a circuit to measure the:

a) Current?

galvanometer or ammeter

B) Voltage?

voltmeter

15. What is the difference between an electrode and an electrolyte?

electrodes are the metal strips in a cell & the electrolyte is a solution where the electricity flows through

16. Match the following terms with their definition:

- 6 cell
- 7 battery
- 12 static electricity
- 11 current electricity
- 8 conductor
- 9 resistor
- 10 insulator
- 18 galvanometer
- 17 ammeter
- 16 primary cell
- 15 secondary cell
- 13 dry cell
- 14 wet cell
- 20 switch
- 2 open circuit
- 1 closed circuit
- 3 generator
- 4 motor
- 5 short circuit
- 19 voltmeter

- 1. A circuit where electricity is allowed to flow.
- 2. A circuit where electricity cannot flow; a break in the circuit.
- 3. A device that uses movement to create electricity.
- 4. A device that uses electricity to create movement.
- 5. A circuit that does not have a load to use the energy from the source. It is dangerous because it can overheat and cause a fire.
- 6. The source of electricity. It has an electrode and an electrolyte.
- 7. Two or more cells joined together.
- 8. A substance that allows electricity to flow through it.
- 9. A substance that does not allow electricity to flow through it.
- 10. A substance that slows the flow of electrons. (can cause heat or light)
- 11. Electricity where the electrons MOVE.
- 12. A build up of electric charge. Electricity where electrons DON'T move.
- 13. A cell that has a paste for its electrolyte.
- 14. A cell that has a liquid for its electrolyte.
- 15. A cell that is re-chargeable.
- 16. A cell that once used, is discharged and cannot be recharged.
- 17. A device that measures strong electric current.
- 18. A device that measure weak electric current.
- 19. A device that measures the "push" of electrons from the cell (voltage)
- 20. A device that turns on and off the circuit.

Reproduction

1 or more

1. What are the 3 points of the cell theory?

1. All living things are made of cells
2. All cells come from pre-existing cells

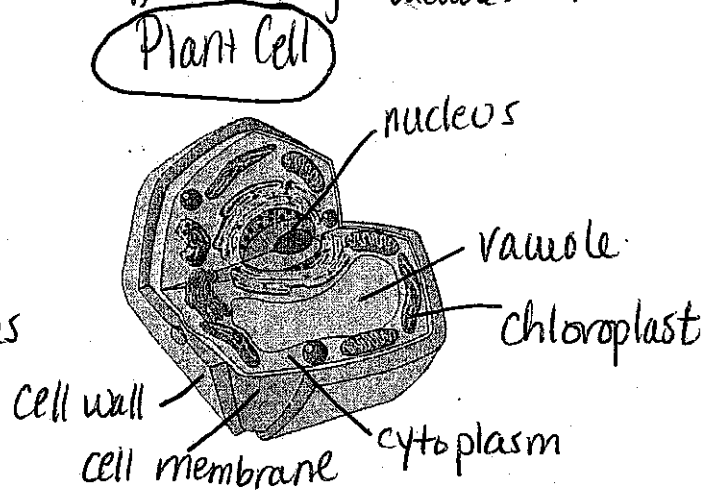
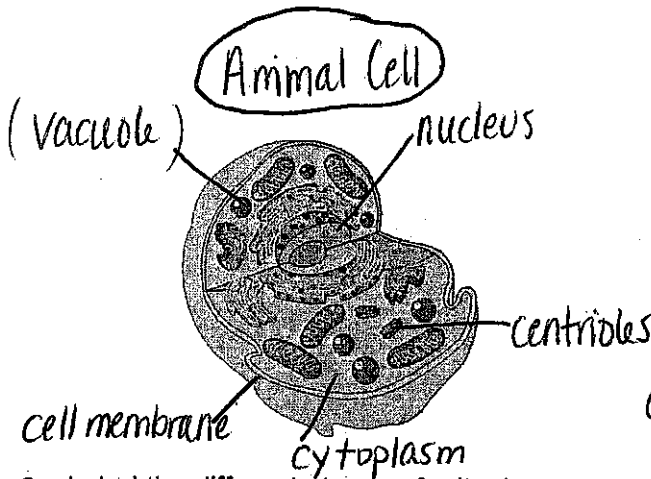
3. Cells are the basic unit of life.

2. a) Label the nucleus, cell membrane, cytoplasm, cell wall, centrioles, vacuoles and the chloroplast on the following two cells. (NOTE: some organelles may only be on one of the cells)

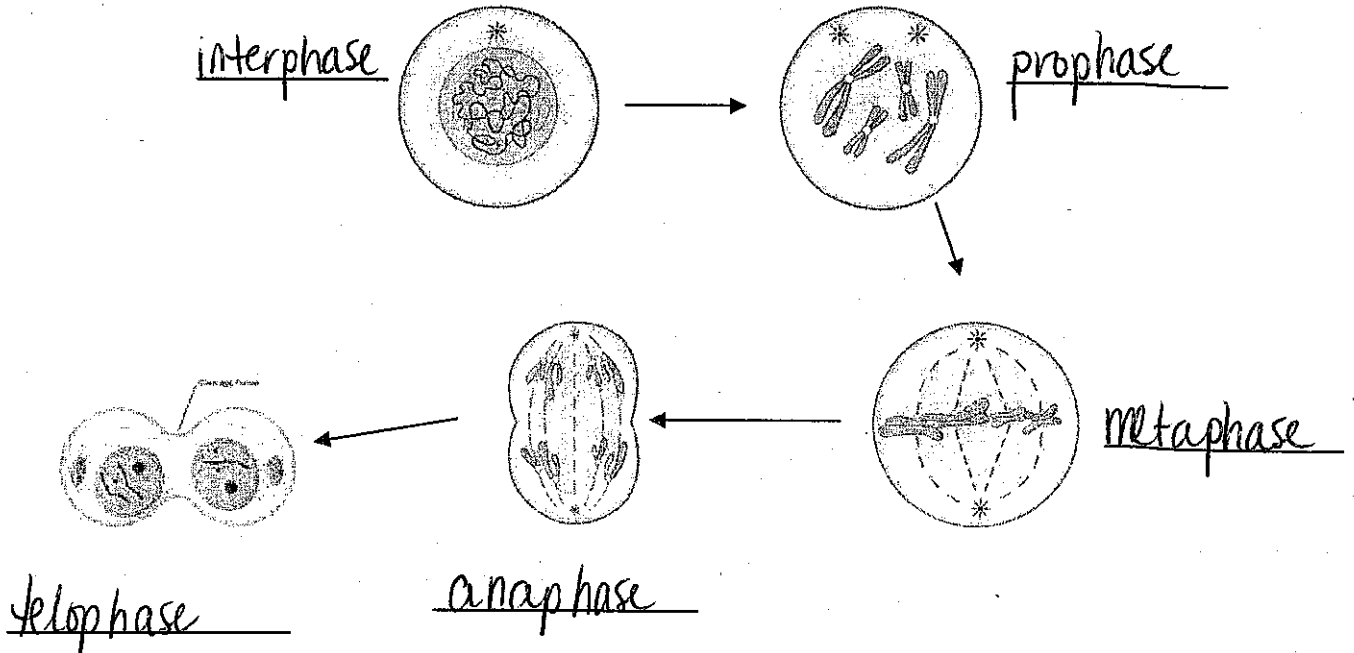
✓ b) Which is the plant cell and which is the animal cell?

c) List 3 differences between plant and animal cells.

- 1) Animal-round Plant-square
- 2) Animal-centrioles Plant-not
- 3) Plant chloroplast+cell wall
- 4) Plant larger vacuole. Animal-not



3. Label the different stages of mitosis



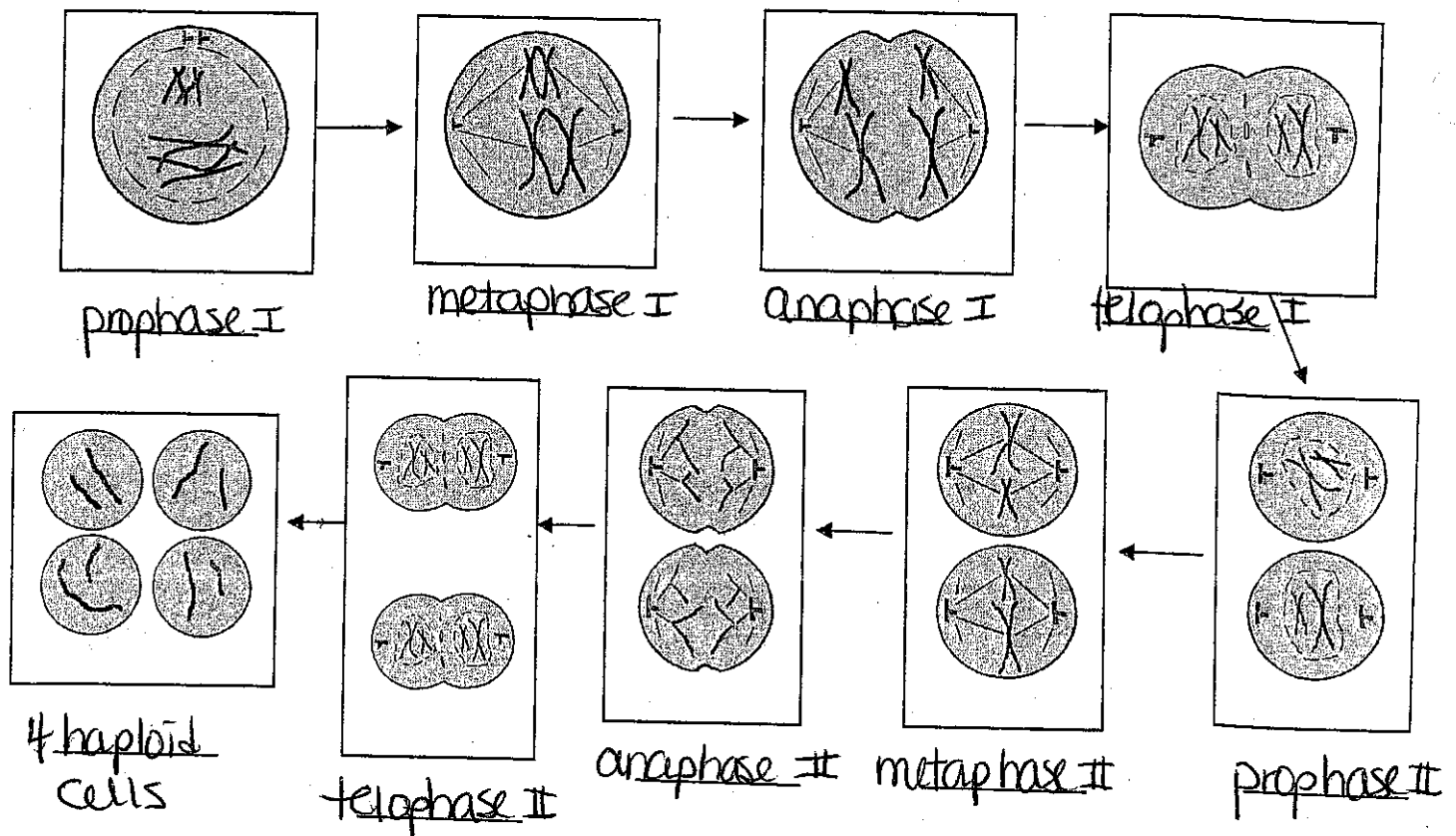
4. Briefly explain what happens at each stage in mitosis:

- a. Interphase - cell prepares for division; duplicates X'somes & grows
- b. Prophase - Chromosomes shorten & thicken
- c. Metaphase - X'somes line up in middle of cell (equator)
- d. Anaphase - 2 halves of X'somes pull to opposite sides
- e. Telophase - cytokinesis begins. Cell splits in 2.

5. The cell cycle includes mitosis and interphase. What 3 things happen during the "interphase" section of the cell cycle?

- ① rapid growth
- ② Duplication of X'somes
- ③ growth & preparation for cell division

5. Label the correct stages of meiosis in the following diagram:





6. What is the difference between anaphase I and anaphase II in meiosis?

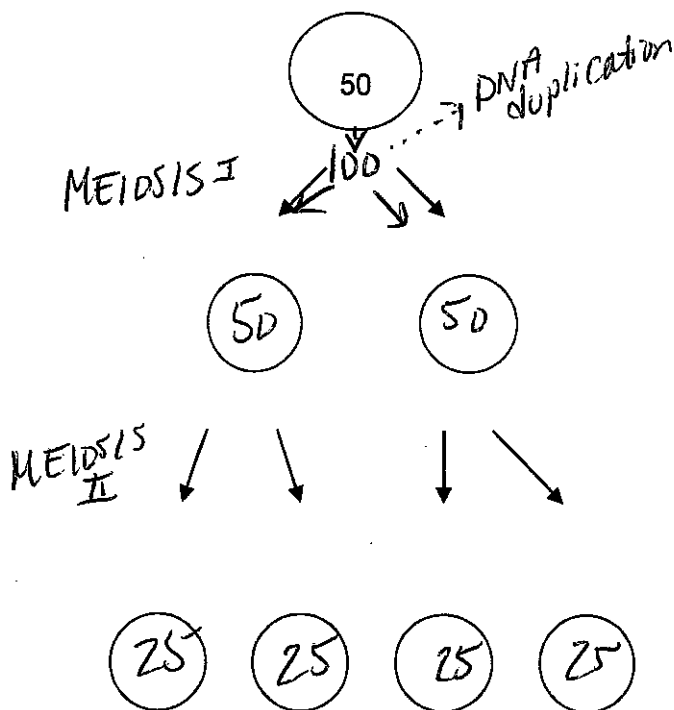
In Anaphase I homologous pairs of chromosomes separate but in anaphase II sister chromatids separate.

7. What is the difference between telophase I and telophase II in meiosis?

Telophase I: 1 cell divides into 2

Telophase II: 2 cells divide into 4 haploid cells

8. Fill in the number of chromosomes in the following meiosis process.



9. Compare and contrast asexual and sexual reproduction.

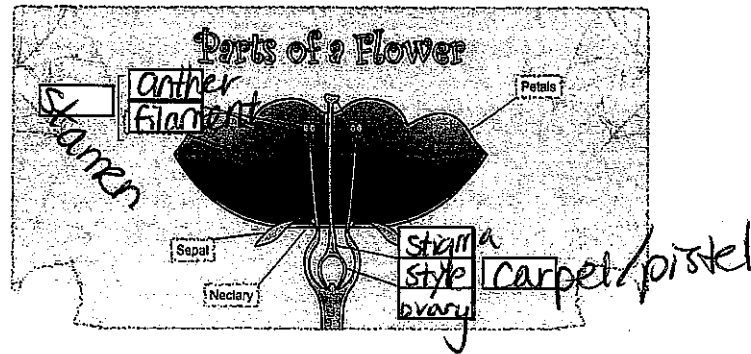
### Asexual

- 1 parent
- identical offspring (clones)
- fast
- can't be any better than parents.

### Sexual

- 2 parents
- new mix of genes
- slow
- can adapt to environment

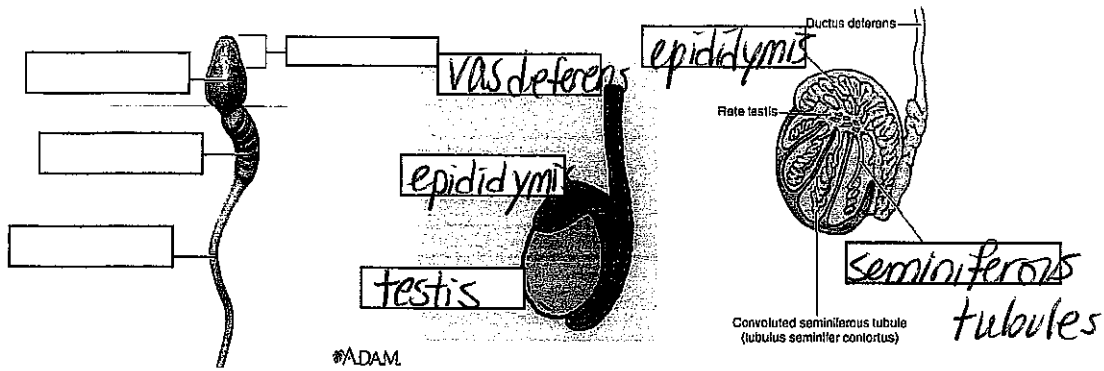
10. Label the parts of the flower on the following diagram:



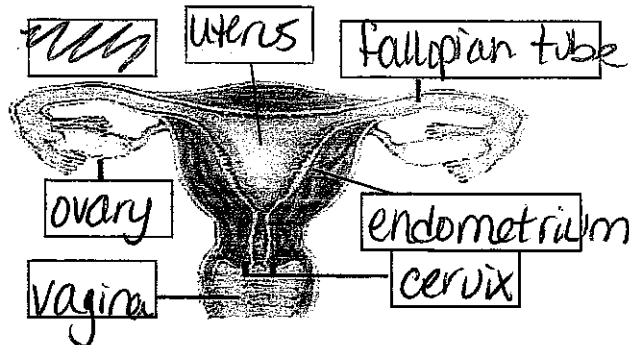
11. If a baby was born with a brown-eye allele from her mom and a blue-eye allele from her dad:

- What is the baby's genotype? **Bb**
- What is the baby's phenotype? **brown**
- Which trait is dominant, **brown** or blue?
- Which trait is recessive, **brown** or **blue**?

12. Label the following diagrams regarding the male reproductive system:



13. Label the following diagram regarding the female reproductive system:



14. Match the following human reproduction terms:

- |               |                 |                |                              |
|---------------|-----------------|----------------|------------------------------|
| a) Eggs       | b) ovaries      | c) uterus      | d) oviduct (fallopian tubes) |
| e) sperm      | f) flagellum    | g) testes      | h) seminiferous tubules      |
| i) epididymis | j) vas deferens | k) follicle    | l) corpus luteum             |
| m) ovulation  | n) menstruation | o) endometrium | p) vagina                    |
| q) zygote     | r) embryo       | s) fetus       |                              |

- |  |   |
|--|---|
| <u>e</u> male reproductive cells   | <u>l</u> nutrient cells that remain in the ovary                  |
| <u>a</u> female reproductive cells   | <u>k</u> cells in the ovary that produce an egg                   |
| <u>g</u> primary male reproductive organ                                     | <u>m</u> the process of releasing an egg                          |
| <u>b</u> primary female reproductive organ                                   | <u>o</u> the thick lining of the uterus (where the embryo embeds) |
| <u>c</u> where the embryo develops and grows                                 | <u>p</u> the birth canal  |
| <u>d</u> where fertilization takes place                                     | <u>q</u> the cell that forms when a sperm fertilizes an egg.      |
| <u>n</u> the process of shedding the endometrial cells                       | <u>s</u> the organism 9 weeks after fertilization                 |
| <u>f</u> the tale of a sperm   | <u>r</u> the dividing fertilized cell about 100 cells             |
| <u>j</u> the tube where sperm is released from                               |   |
| <u>i</u> where sperm complete their development                              |   |
| <u>h</u> the tiny twisting tubes lined with reproductive cells to make sperm |   |

15. Match the following terms with their definitions:

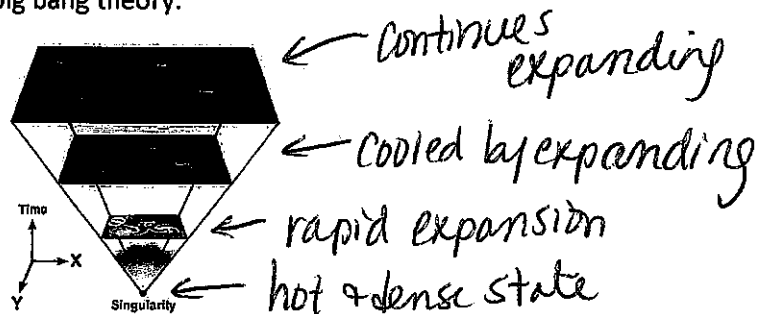
- |                                   |  |
|-----------------------------------|--|
| <u>8</u> binary fission           | 1. Having 2 sets of chromosomes (1 from mom and 1 from dad).   |
| <u>9</u> budding                  | 2. Having half the complete set of chromosomes.  |
| <u>11</u> regeneration            | 3. A pair of chromosomes that carry genes for the same trait in the same position on the chromosome. |
| <u>10</u> spore formation         | 4. The 2 halves of a duplicated chromosome (attached at the center)                                  |
| <u>7</u> parthenogenesis          | 5. A change in the genetic code (DNA)  |
| <u>12</u> vegetative reproduction | 6. Uncontrolled cell growth.   |
| <u>14</u> conjugation             | 7. Where an unfertilized egg develops into an organism.  |
| <u>13</u> hermaphrodite           | 8. Where one organism splits into 2 equal sized offspring.   |
| <u>15</u> pollination             | 9. Where an offspring starts as a small outgrowth on the parent.                                     |
| <u>16</u> spontaneous generation  | 10. The organism undergoes frequent cell division to produce spores                                  |
| <u>3</u> homologous chromosome    | 11. A new organism is formed from a part broken off of the parent.                                   |
| <u>4</u> sister chromatids        | 12. Where new plants are formed through mitosis and growth.  |
| <u>1</u> diploid                  | 13. An organism that has male and female sex cells.  |
| <u>2</u> haploid                  | 14. Where 2 cells exchange small pieces of genetic material.   |
| <u>6</u> cancer                   | 15. Where pollen is moved from anther to the eggs.   |
| <u>5</u> mutation                 | 16. The theory where living organisms arise from non-living matter.                                  |

## Space

1. What are the 4 parts of the big bang theory?

- 1) universe was an extremely hot & dense state
- 2) the state expanded rapidly (big bang)
- 3) has since cooled by expanding
- 4) continues to expand.

2. Label the following diagram of the big bang theory.



3. What are the 3 parts of the planetesimal theory?

- 1) star collided with sun causing matter to be scattered
- 2) matter cooled & became solid bodies called planetesimals
- 3) planetesimals began following orbits due to sun's gravity

4. What are the 3 parts of the nebular theory?

- 1) nebula began to spin & spread out
- 2) particles began to clump together
- 3) clumps grew large & evolved into planets.

5. List the 8 planets of our solar system starting with the planet closest to the sun.

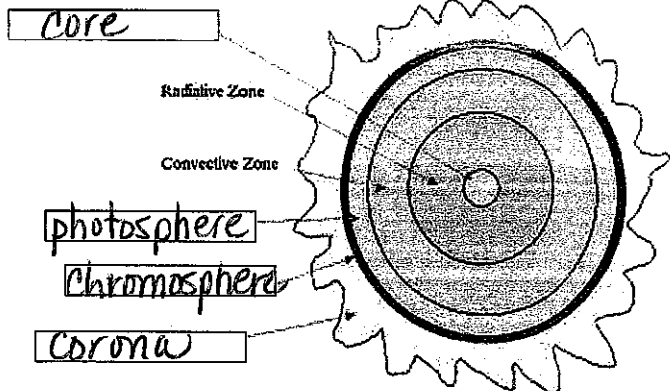
mercury venus earth mars jupiter saturn uranus neptune

6. If Mercury is  $57.9 \times 10^6$  km away from the sun and we know that 1 a.u. = 150,000,000 km, how many astronomical units is Mercury away from the Sun?

$$57.9 \times 10^6 \text{ km} \times \frac{1 \text{ au}}{150,000,000 \text{ km}} = 0.4 \text{ au}$$

7. Label the following diagram of the sun using the words below:

CORONA
PHOTOSPHERE
CORE
CHROMOSPHERE



8. Fill in the blanks about the life of stars using the words provided:

~~Hydrogen~~  
~~swells up~~  
~~white dwarf~~

~~Nebulas~~  
cools down

~~nuclear fusion~~  
black hole

~~dust~~  
supernova

~~gas~~  
redder

~~larger~~  
~~neutron~~

Stars are born when huge clouds of dust and gas (called nebulas) swirl into clumps and contract because of gravitational forces. Eventually, the clumps are dense and hot enough for energy to be given off through the process of nuclear fusion. When a star nears the end of its life, it runs out of hydrogen and other fuels needed for produce energy. When this happens, there is less pressure holding the star together so the star swells up and cools down. Therefore, in its old age, a star becomes larger and redder.

When a small or medium star dies, the outer layers of the star drift away and the remaining material becomes a white dwarf. When a large star or extremely large star dies, an enormous explosion occurs called a supernova. The resulting core of a large star (about 10 times the mass of the Sun) after this explosion is called a neutron star, which is an extremely dense star. After the explosion of an extremely large star (about 30 times the mass of the Sun), the resulting core is a black hole, which is a small, very dense object with a force of gravity so strong that nothing can escape from it.

9. Match the following terms with their definition:

C universe

F solar system

A nebula

B sun

G star

E planet

H inner planet

D outer planet

~~A.~~ A cloud of dust and gas.

~~B.~~ A star around which Earth and 7 other planets revolve.

~~C.~~ Everything that physically exists; the entirety of space and time and all forms of matter and energy.

~~D.~~ A planet in the solar system beyond the four inner planets

~~E.~~ A large piece of matter, generally spherical, that revolves around a star (the Sun)

~~F.~~ The sun and all the objects that travel around it.

~~G.~~ A large collection of matter that emits huge amounts of energy

~~H.~~ One of the four small planets close to the Sun, with a density roughly the same as the density of a rock.

