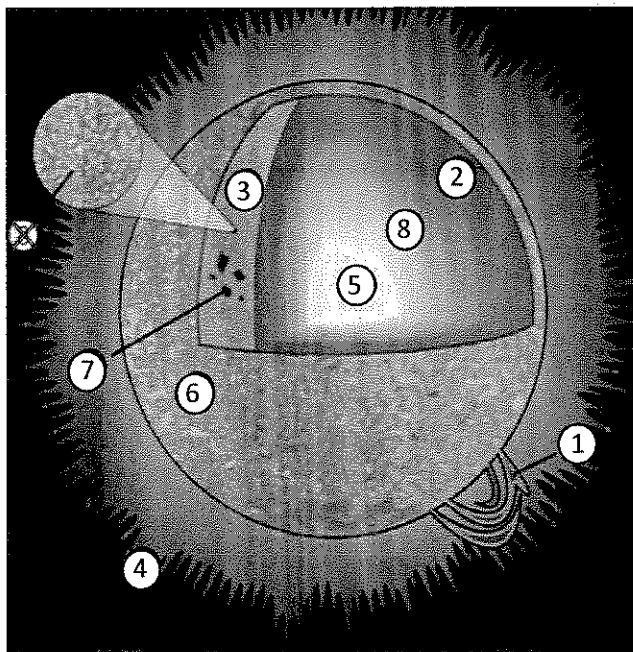## Science 9
Exam Review: Diagrams and Other Exercises

The Sun

1. Identify the parts of the Sun's interior, atmosphere and features by writing appropriate terms on the lines below.

1. prominence
2. Convection Zone
3. photosphere
4. Corona
5. Core
6. Chromosphere
7. Sunspots
8. radiation Zone

2. Match each term with its description by printing the letter of the correct description in the right column on the line next to the term in the left column.
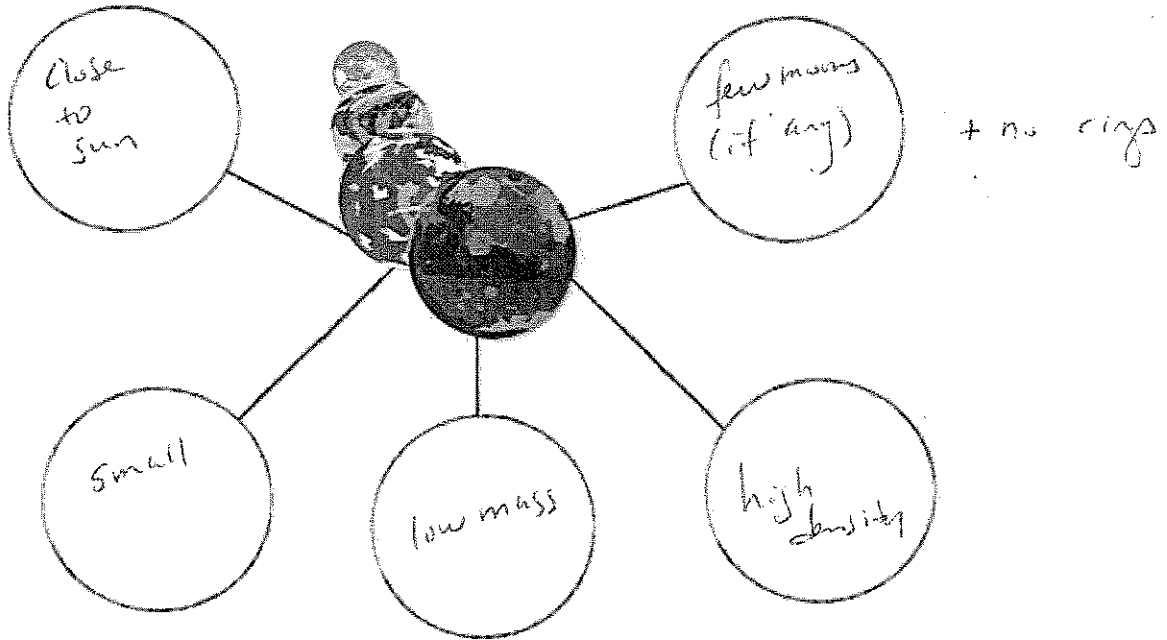
__F__ 1. solar wind

__A__ 2. corona

__E__ 3. prominence

__J__ 4. convection zone

__K__ 5. photosphere

__I__ 6. solar flare

__B__ 7. nuclear fusion

__D__ 8. chromosphere

__H__ 9. radiation zone

__G__ 10. sunspot

__C__ 11. core

A. the layer of the Sun's atmosphere that looks like a halo during an eclipse
B. the joining of hydrogen atoms to form helium
C. the center of the Sun
D. the layer of the Sun's atmosphere that has a reddish glow
E. reddish loops of gas that link parts of sunspot regions
F. a stream of charged particles produced by the corona
G. areas of gas on the Sun's surface that are cooler than the gases around them
H. the layer of the Sun's interior where energy is transferred mainly by electromagnetic radiation
I. eruptions that occur when the loops in sunspot regions suddenly connect
J. the outermost layer of the Sun's interior
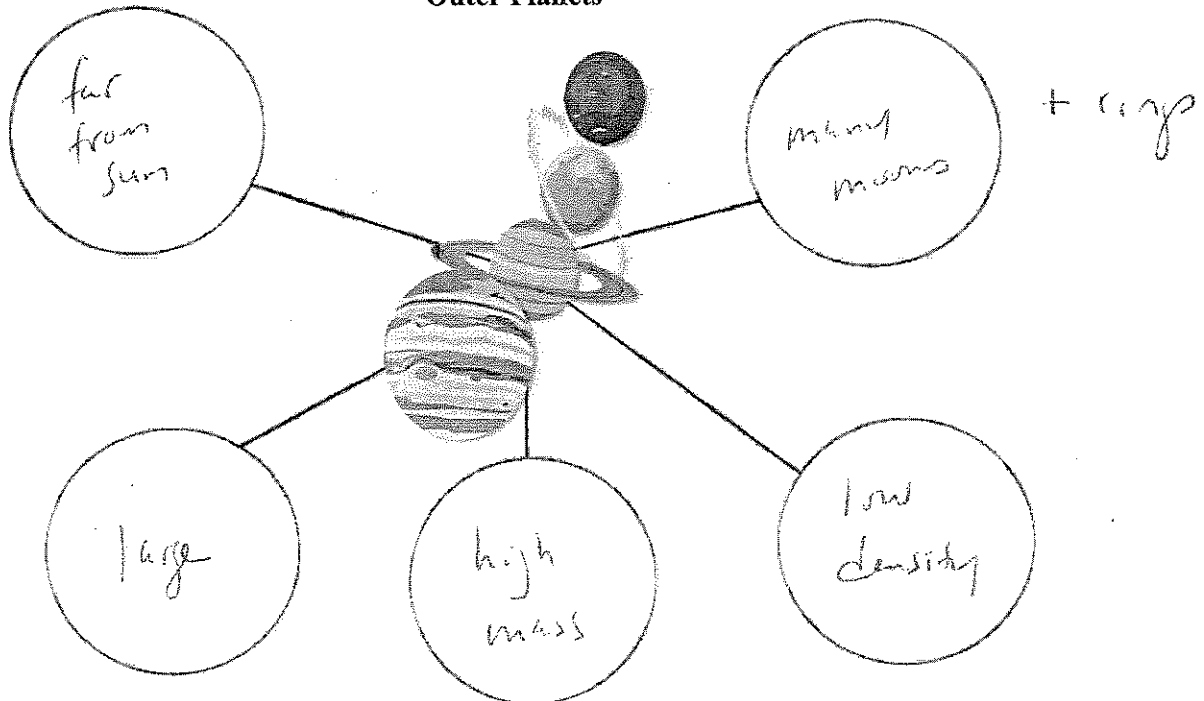K. the layer of the Sun's atmosphere that gives off visible light

The Planets

In your notes, you were given a number of characteristics for the planets in the inner solar and outer solar system. Provide 5 characteristics on the diagrams below. You may want to consider the following: distance from the Sun, size, mass, density, presence or absence of moons, presence or absence of rings.

Inner Planets

Close to sun

few moons (if any)

+ no rings

Small

low mass

high density

Outer Planets

far from sun

many moons

+ rings

large

high mass

low density

The Motion of Celestial Bodies

On each line provided, print a term from the box below that makes each statement true. There are extra terms in the box.

1. The orbit of a planet around the Sun has a(n) ___elliptical___ shape.

2. Because the Moon has a ___synchronous___ rotation, it does not seem to be spinning as it orbits the Earth.

3. Most comets have stable orbits in the outer reaches of the solar system past the planet ___Neptune___.

4. The Earth rotates around an imaginary line called a(n) ___axis___. The Earth is tilted on this imaginary line at an angle of ___23.5°___.

5. Planets ___revolve___ around the Sun.

6. The Sun revolves around the center of the ___Milky Way Galaxy___ The time this takes is called a ___cosmic year___.

7. The Earth is tilted ___away___ from the Sun during the winter.

8. Asteroids mostly orbit our Sun in the ___asteroid belt___ between Mars and Jupiter.

9. The ___heliocentric___ theory of planetary motion states that all celestial bodies orbit the Sun.

Terms
revolve
cosmic year
23.5°
heliocentric
away
elliptical
Mars
axis
toward
geocentric
synchronous
53.2°
Milky Way Galaxy
Neptune
round
asteroid belt

Hypothesis, Law and Theories

Print the letter of the appropriate description from the right on the line provided in front of the term on the left.

E 1. Oscillating Theory (Big Bounce)

D 2. Nebular Hypothesis

B 3. Big Bang

A 4. Hubble's Law

C 5. Big Crunch

A. the farther something is from Earth, the faster it seems to be moving away — supported by red shift data

B. the matter in the universe was compressed into a hot, dense mass that began to move outward after a massive explosion

C. as gravity pulls on matter, the universe will begin to contract, falling inward until it has collapsed back into a super-hot, super-dense singularity.
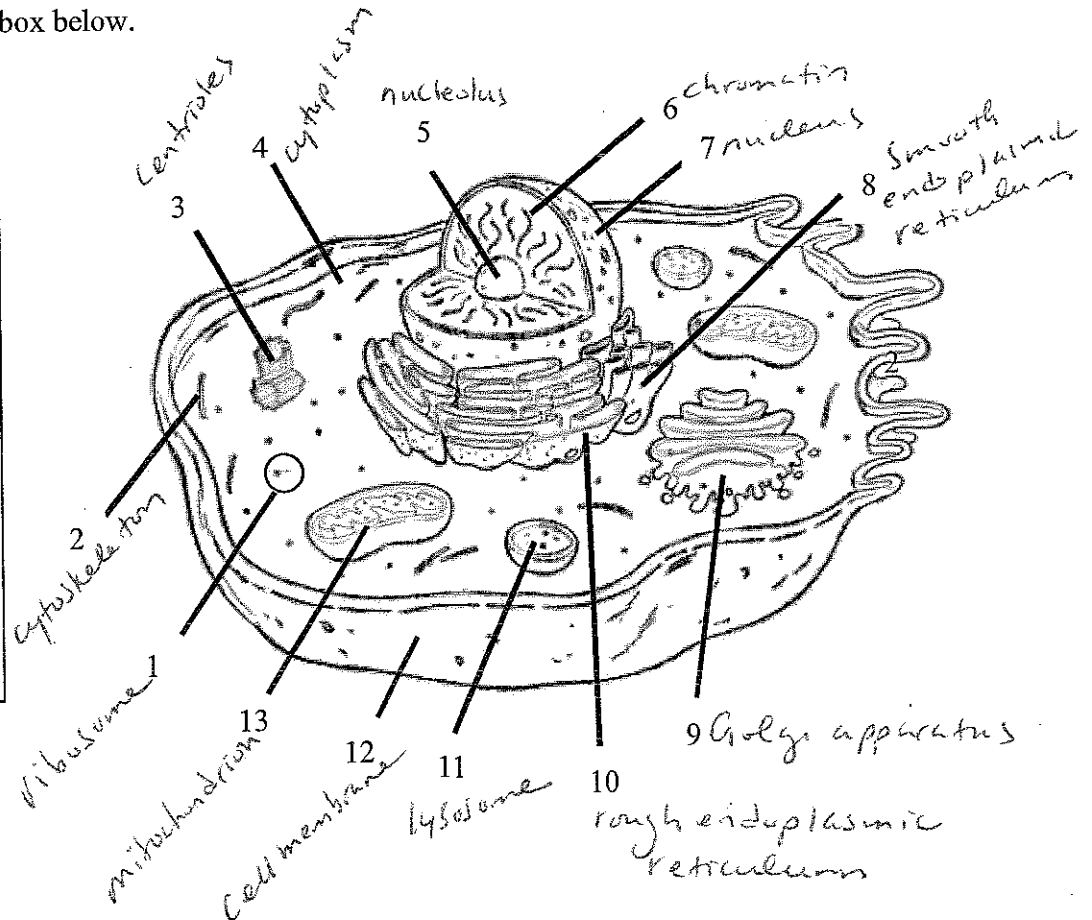
D. provides an explanation for the formation of our solar system

E. proposes that the universe passes through a series of expansions and contractions

Cell Parts

1. Study the diagram. Beside each number, print the name of the cell part indicated. Names of parts are provide the box below.

Cell Parts

mitochondrion
chromatin
centrioles
nucleolus
cytoplasm
ribosome
nucleus
cell membrane
cytoskeleton
lysosome
Golgi apparatus
smooth endoplasmic reticulum
rough endoplasmic reticulum

Handwritten labels: 3 centrioles, 4 cytoplasm, 5 nucleolus, 6 chromatin, 7 nucleus, 8 smooth endoplasmic reticulum, 2 cytoskeleton, 1 ribosome, 13 mitochondrion, 12 cell membrane, 11 lysosome, 10 rough endoplasmic reticulum, 9 Golgi apparatus

2. Print the letter of the appropriate description from the right on the line beside the term on the left.

_M_ 1. lysosome

_G_ 2. cytoplasm

_L_ 3. mitochondrion

_I_ 4. centrioles

_H_ 5. spindle fibers

_J_ 6. Golgi apparatus

_B_ 7. cytoskeleton

_K_ 8. nucleolus

_A_ 9. endoplasmic reticulum

_E_ 10. cell membrane

_F_ 11. ribosome

_D_ 12. nucleus

_C_ 13. chromatin

A. helps process molecules created by the cell and transports molecules to their specific destinations
B. gives a cell its shape and offers support
C. helps package DNA in a compact form that fits in the cell nucleus
D. serves as the cell's command center
E. separates the cell from its environment and allows materials to enter and leave the cell
F. processes the cell's genetic instructions to create proteins
G. a jelly-like fluid and other structures that surround the nucleus
H. chiefly involved in moving and dividing chromosomes during nuclear division
I. organelles occurring in pairs and involved in the development of spindle fibers in cell division
J. packages molecules processed by the endoplasmic reticulum to be transported out of the cell
K. a condensed region of chromatin where ribosomes are manufactured
L. a complex organelle that converts energy from food into a form that the cell can use
M. digests foreign bacteria, rids the cell of toxic substances and recycles worn out cell parts

The Cell Cycle and Types of Cell Division

1. Identify the parts of the cell cycle in the diagram.

A - _interphase_
B - _G1 - growth phase_
C - _S - Synthesis phase_
D - _G2 - growth phase_
E - _prophase_
F - _metaphase_
G - _anaphase_
H - _telophase_
I - _mitosis_
J - _cytokinesis_

PMAT
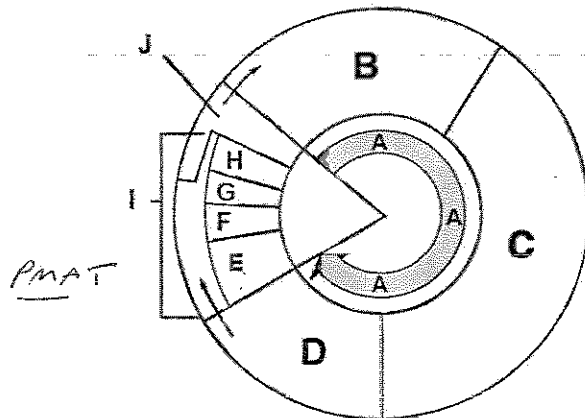
2. Label interphase and the phases of mitosis on the diagram below. The diagrams are not in in order.

metaphase   telophase   prophase   interphase   anaphase
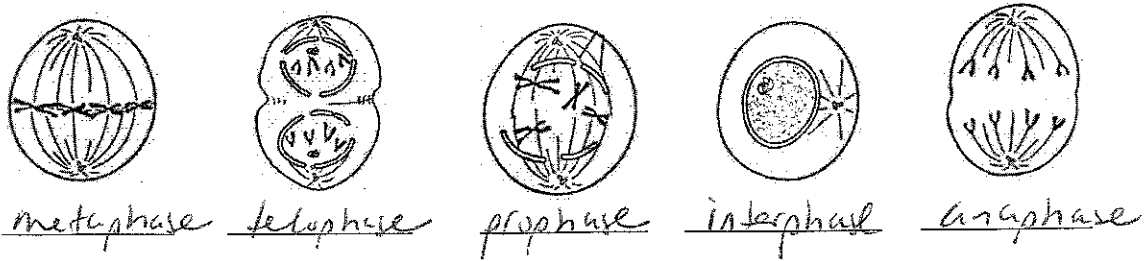
The Life Cycle of Stars

Place "1" on the line beside the first stage of the life cycle of a low mass star, "2" on the line beside the second stage, "3" beside the third stage, etc.

5 After a star begins to die, gravity causes the last of the star's matter to collapse inward and compact. This is the white dwarf stage of a star's life cycle.

2 After a cloud begins to glow brightly, it contracts a little, becomes stable and is known as a main sequence star.

6 A star reaches the black dwarf stage once it stops emitting light.

3 A low mass star reaches the red giant stage after the outer shell of the star expands, cools and glows red.

1 After gravity pulls the hydrogen gas in a nebula together, it begins to spin. The gas spins faster and faster, heats up and is then known as a protostar.

4 When the last of the hydrogen gas in the outer shell is blown away, a ring called a planetary nebula forms around the core of the star.

**Types of Cell Division**

Complete the Venn diagram below for mitosis and meiosis using the following information.

Produces 4 haploid daughter cells.	Genetic variation increases.	8 stages (plus interphase)
Starts with a single parent cell.	Purpose is cell production.	Genetic variation doesn't change.
4 stages (plus interphase)	Similar basic steps.	Happens in germ cells.
Produce new cells.	Produces 2 diploid daughter cells.	
Happens in somatic cells.	Purpose is sexual reproduction.	

Mitosis   **Meiosis**

4 stages (+ interphase)

genetic variation doesn't change

happens in somatic cells

purpose is cell production

produces 2 diploid daughter cells

produce new cells

similar basic steps

Starts with a single parent cell

produces 4 haploid daughter cells

genetic variation increases

purpose is sexual reproduction

8 stages (+ interphase)

happens in germ cells.
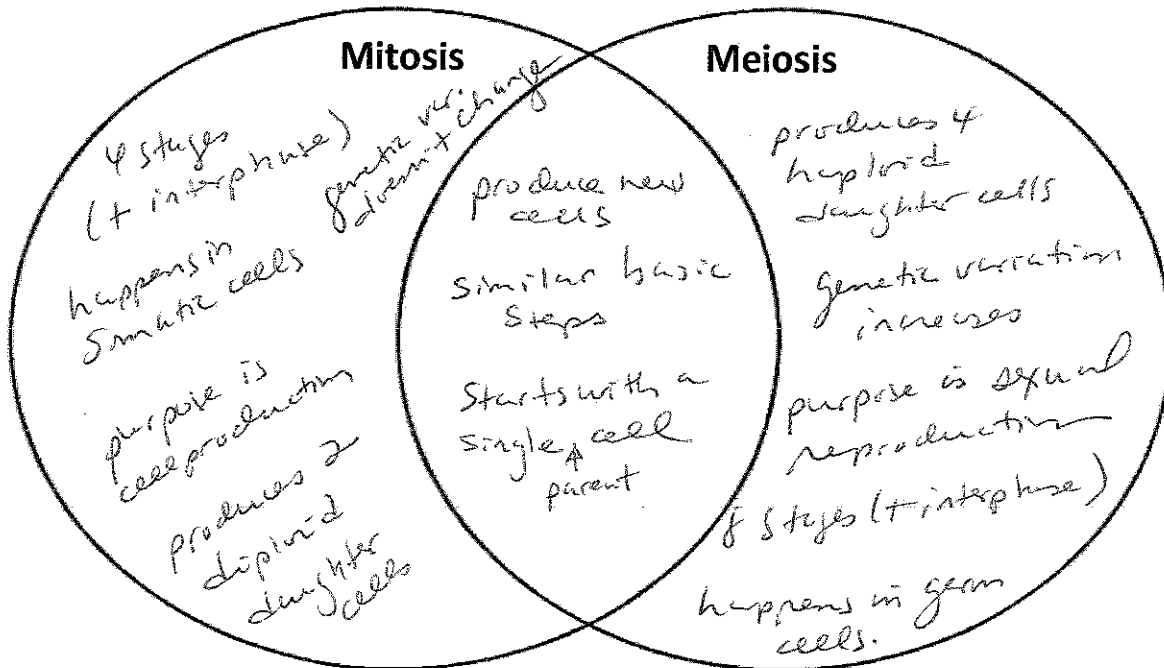
Calculations: Speed, Time, Distance

#1   #2

speed	time	distance
$v = \dfrac{d}{t}$	$t = \dfrac{d}{v}$	$d = vt$
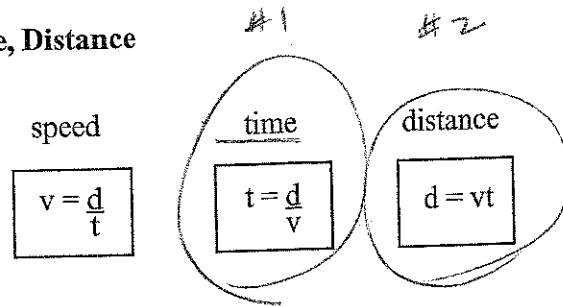
1. Helios II, a spacecraft from the 1970s, reached a maximum speed of 2.41×10^5 km/h on its space mission. How long would it take Helios II to travel between our Sun and Sirius, a distance of 4.26×10^{13} km? $(1.77 \times 10^8$ h)

$$V = 2.41 \times 10^5 \, km/h$$

$$t = ?$$

$$d = 4.26 \times 10^{13} \, km$$

$$t = \frac{d}{V}$$

$$t = \frac{4.26 \times 10^{13} \, km}{2.41 \times 10^5 \, km/h}$$

$$t = 1.77 \times 10^8 \, h.$$

2. When it slipped into orbit around Jupiter in July 2016, NASA's Juno probe briefly clocked in at 2.66×10^5 km/h. At this speed, it would take the Juno probe 1.96×10^8 h to travel from our Sun to the LHS 292 star system. How far is LHS 292 from our Sun? $(5.21 \times 10^{13}$ km)

$$V = 2.66 \times 10^5 \, km/h$$

$$t = 1.96 \times 10^8 \, h$$

$$d = ?$$

$$d = vt$$

$$d = \left(2.66 \times 10^5 \frac{km}{h}\right)\left(1.96 \times 10^8 \, h\right)$$

$$d = 5.21 \times 10^{13} \, km.$$

Genetic Changes

Complete each sentence below with a term from the list below to make the statement true. There are extra words provided.

blood	~~mono~~	~~G-T~~
~~trisomy~~	egg	~~monosomy~~
~~growth~~	~~genetic mutation~~	can
C-A	~~somatic~~	~~germline~~
di	~~development~~	~~tri~~
~~systems~~	disomy	~~acquired~~
~~cannot~~		~~sperm~~

1. Mutations that occur in cells other than the sex cells are called _Acquired_ or _Somatic_ mutations. These mutations _Cannot_ be passed on to the next generation.

2. When the nucleotide sequence of an organism is altered, a(n) _genetic mutation_ results.

3. Hereditary mutations are also called _germline_ mutations because they are present in the parent's egg or _Sperm_ cells.

4. a) A change in the number of an organisms chromosomes can cause problems with _growth_, _development_, and functions of an organism's body _Systems_.
   b) _Mono_ is Greek for one. _Monosomy_ is used to describe the absence of one member of a pair of chromosomes.
   c) _Tri_ is Greek for three. _Trisomy_ is used to describe the presence of three chromosomes instead of the usual pair.

5. The most common mutation in human DNA is the _G-T_ mutation.