Philippine Science High School Qualifying Exam

NOTES:

Study Tips:

-Study in quiet and well lighted room.

-Do not slouch (higa) while studying.

-Do not cram/ overstudy. (mamemental block ka pagdating ng exam)

-Have a 10-15 min break(eat, drink, or walk) for every 1-2 hours of studying.

-Sleep Early(10pm) and wake up early(5am).

-Organize materials/ ideas (mas madali mgmemorize ng organize kesa random)

-Improvise a mnemonics. (initials, sing it, etc)

-Study just long enough to be able to repeat to yourself once most of the material. Then go on to something else. Perhaps later return to the previous material to see if you have still retained it.

-focus on your weak spots(Math-Arithmetic, Fraction, Ratio and Prop, Interest, Word Prob,etc
English-Correct Usage, Analogy, Identifying errors, Vocabulary
Science- more on biology)

-If you do not know the solution in the book, just memorize the steps and don't bother.

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Concentration Tips:

-stick to routine/schedule.

-study in a quiet and well lighted environment. It may help to play classical music.

-review main topics that are included in the subject before answering it

-Avoid daydreaming by asking yourself questions about the material as you study it.

- Resist distractions by sitting in front of the room away from/ disruptive classmates and by focusing on the instructor through listening and note taking.

-relate the subject in real life. (watch news every morning)

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Exam Tips:

-mark your guessed answers and get back to them when you have time

-do not leave blank answers.(sagutan mo lahat)

-manage your time in every item. (math -100sec; science-40s; English- 20s;Abstract-15s)

Before Exam:

-get a good night sleep

During Exam

-be confident.(wag kabahan)

-go to examination early(15 min before exam)

After Exam

-PARTY PARTY!!!

Math

1. Arithmetic

a. addition, subtraction, multiplication, addition of whole numbers, roman numerals, hindu-Arabic numerals, fraction, decimal (PEMDAS)

b. estimating numbers-

-round off- the next number is from 5-9.

-do nothing- the next number is from 1-4.

c. divisibility rules:

2-last digit is divisible by 2.(36,6 /2=3, 36 is divisible by 2)

3- sum of its digits is divisible by 3.(36, 3+6=9/3=3, 36 is divisible by 3)

4- last 2 digits are 0 or divisible by 4.(1236, 36/4=9, 1236 is divisible by 4)

5- last digit is 0 or 5.

6-divisible by 2 AND 3. (24, 24/2=12;24/3=8, 24 is divisible by 6)

7-two times the last digit of the number subtracted from the remaining digits of the number gives a difference that is divisible by 7. (161, 2X1=2; 16-2=14, 161 is divisible by 7)

8-numbers formed by last 3 digits are divisible by 8.(168/8=21, divisible by 8)

9-the sum of its digits is divisible by 9.(144,1+4+4=9, divisible by 9)

10- last digit is 0

d. prime and composite numbers:

a. prime number has only two factors 1 and itself.

b. composite number has factors other than 1 and itself.

c. numbers 0 and 1 are neither prime nor composite. They are special numbers.

e. prime factorization- process of expressing a composite number as a product of its prime factors.

-using factor tree.(easier)

```
        3          1. Think 2 factors of 54=9X6
    9<             2. Factor 9 and 6. (9=3X3, 6=3X2)
54<     3          3. The answer is the product of the prime numbers.
   6<2             54=3 X 3 X 3 X 2
     2
```

-using continuous division

```
3|54          54=3 X 3 X 3 X 2
3|18
3|6           *use prime numbers as divisors
2|2
  1
```

f. GCF and LCM

a. GCF- greatest common factor

find GCF of 28& 36:

```
28=2X2X7          1. Find the prime factors of the two numbers(28&36).
36=2X2 X  3X3
GCF = 2X2=4       2. Bring down only the factors that they both have in common.
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b. LCM- least common multiple

find LCM of 28& 36:

```
28=2X2X7          1. Find the prime factors of the two numbers(28&36).
```

36=2X2 X 3X3

LCM= 2X2X7X3=84 2. Bring down all the factors and count as 1 the numbers they both have in common.

g. Fractions-A small part or item forming a piece of a whole.

- also used to indicated division.

1.kind of fractions:

a. proper fraction- numerator is less than denominator(value is less than 1)

b. improper fraction- numerator is equal to or greater than the denominator(value is greater than 1)

c. mixed fraction- composed of whole number and a proper fraction. It is an indicated sum.

d. similar fraction- same denominators

e. dissimilar fractions are fractions with different denominators.

f. equivalent fraction- different fraction with the same value. It can be formed by multiplying or dividing the numerator and denominator of a fraction by the same nonzero number. All lowest term fractions are equivalent fraction to their original fraction.

2. converting mixed numbers to improper fractions.(times plus)

$2^4/_7 = {}^{18}/_7$ →numerator is 7X2=14, 14+4= 18 (times, plus), denominator is unchanged.

${}^{18}/_7 = 2\,^4/_7$ → numerator of mixed number is 18/7= 2 remainder 4, denominator is unchanged.

3. lowest term -divide both the numerator and the denominator by their GCF .

-the GCF of the numerator and denominator is 1.

GCF is 3:

$${}^3/_6 = \frac{3 \div 3}{6 \div 3} = {}^1/_2$$

4. comparing and ordering fractions

Steps: 1. Put the fractions in lowest term.

2. use cross multiplication to compare.

3. follow the instructed order, ascending(pataas)/ descending(pababa)

${}^4/_6 < {}^9/_{12} = {}^2/_3 < {}^3/_4$

a. cross multiply 8 < 9

$$\frac{2}{3} < \frac{3}{4}$$

b. find the LCD

${}^2/_3 < {}^3/_4$ Find LCD of 3&4 =12

${}^8/_{12} < {}^9/_{12}$ compare the numerators (8<9)

5. addition and subtraction of fraction(divide times)

a. adding similar fractions:

$^3/_9 + {}^4/_9 = {}^7/_9$ → retain the denominator and add the terms in numerator.

b. adding dissimilar fractions:

$^3/_9 + {}^2/_6 = \ {}/_{18}$ →Find the LCD of 9 & 6= 18

$^3/_9 + {}^3/_6 = {}^6/_{18} + {}^9/_{18}$ → divide LCD to denominator then multiply (divide times)

18÷9X3=6 18÷6X2=9

$^3/_9 + {}^2/_6 = {}^{6+9}/_{18} = {}^{15}/_{18}$→ add the numerator just like in similar fractions.

6.Multiplication of fractions:

a. im/proper to im/proper:

$^2/_3 X {}^4/_5 = {}^{2X4}/_{3X5} = {}^8/_{15}$ → multiply the numerator, multiply the denominator.

b. whole number to im/proper:

$3X {}^4/_5 = {}^3/_1 X {}^4/_5 = {}^{12}/_5$ → multiply the numerator, multiply the denominator.

c. mixed number to im/proper:

$1\,{}^2/_3 X {}^4/_5 = {}^5/_3 X {}^4/_5 = {}^{20}/_{15}$ →convert the mixed number to improper fraction then multiply

7. Division of fractions:

a. im/proper to im/proper:

$^2/_3 \div {}^4/_5 = {}^2/_3 X {}^5/_4 = {}^{10}/_{20}$ → find the reciprocal of the divisor then multiply

b. whole number to im/proper:

$3 \div {}^4/_5 = {}^3/_1 X {}^5/_4 = {}^{15}/_4$ →find the reciprocal of the divisor then multiply

c. mixed number to im/proper:

$1\,{}^2/_3 X {}^4/_5 = {}^5/_3 X {}^5/_4 = {}^{25}/_{12}$ →convert the mixed number to improper fraction
find the reciprocal of the divisor then multiply.

h. <u>decimals-</u> is found at the right of the decimal point.

a. fraction to decimal:

$^1/_2 = 0.5$ → $2\overline{)1}$ (0.5)

b.decimal to fraction.

$0.5 = {}^5/_{10} = {}^1/_2$ → divide the whole number by power of tens then simplfy.

h. Ration and proportion:

NOTEs:

ratio- fraction.
Proportion- tapat tapat.
BaseX rate= percentage.
Rate- less than 1
Base- mas malaki kesa percentage
Percentage- mas maliit kesa base
Total Commission= total priceX rate
I=PRT (interest= principalXrateXtime)
Principal- total price(base)
Rate- percent(%) , less than 1
Interest- uutangin.
Time- time kung hanggang kelan babayaran

Sum/total/how many → +
Difference/left →-
Rate of a whole →X
Divide →/

Science:

Biology

I. Human Body:

A. Skeletal System

1. consist - of bones, cartilages, ligaments and joints.
2. function - protect
s internal organs
-helps in body movements.
-provides the framework of the body.
-red blood cells are formed in red marrow.
- yellow marrow acts as the storage of fat and minerals.
3. Types of bones(CSP):
a. compact bones-bones without any open spaces.
b. spongy bones- many open spaces.
c. cartilage- soft, strong, and flexible tissue that provides for growth during childhood.

*bone is made up of connective tissue surrounded by minerals.
*cartilage is a strong, flexible, tissue that provides shape to some parts of the body.

4. classification(FSL)- flat bones, long bones, short bones and irregular bones.
a. flat bones- ribs, breastbone, and shoulder bones.
b. short bones- support weight and allow small movements.
c. long bones are strong hollow and light.
5. location

Upper limbs- humerus, ulna, radius, carpal, metacarpals and phalanges.
Lower limbs- femur, tibia, fibula, tarsal , metatarsals and phalanges.
*As you grow older, the number of bones decreases.(there are 206 bones in adults. 270 bones at birth)
* the vertebral column consist of 24 single bones.
6. Other special structure:
*Joints-place where two or more bones meet. Allow movements of the body up and down, etc..
*Ligaments- the movable joints are connected to bones by connective tissues that can stretch.
Types of Joints:

a. Immovable joints/ Fixed joints- connects the bones in the skull.

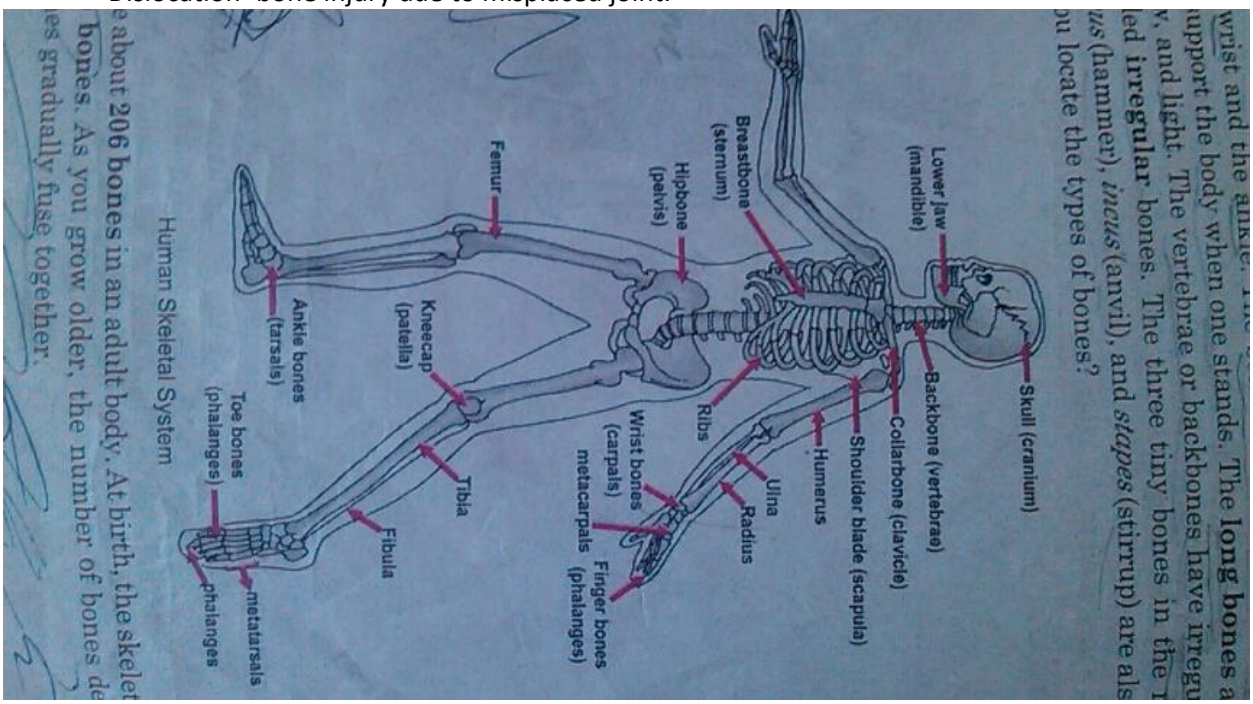
b. Movable joints- allow movements of the body. (include the ball and socket(all direction), hinge joints(backward and forward), pivotal joints(side-to-side and up-and-down) and gliding joints(hands to glide/slide))

7. Ailments and Disorders
a. Arthritis-an inflammation of the joint.
b. Osteoporosis- disease due to lack of substance(vit. D) in the bone.
c. Rheumatism- a disease of the joints due to lack of exercise.
d. Backache or Back Pain-pain at the vertebral column.
e. Bone injuries(FSD):

-Fracture- a broken bone.

-Sprain- an injured lgament.

-Dislocation- bone injury due to misplaced joint.



B. **Muscular System** -humans made up of more than 600 muscles. Muscles are made up of thousands of muscle fibers.
1. function- make the bones move through the tendons.

-allows the heart and other internal organs to move.

2. types (SCS):

a. Skeletal muscles- most of muscles in our body like legs, arms, etc.

b. Cardiac muscles-heart

c. Smooth muscles-includes internal organs, blood vessels, bladder.

3. Ailments and Diseases:

a. muscle cramps- muscle pain caused by lack of blood supply in the muscles.

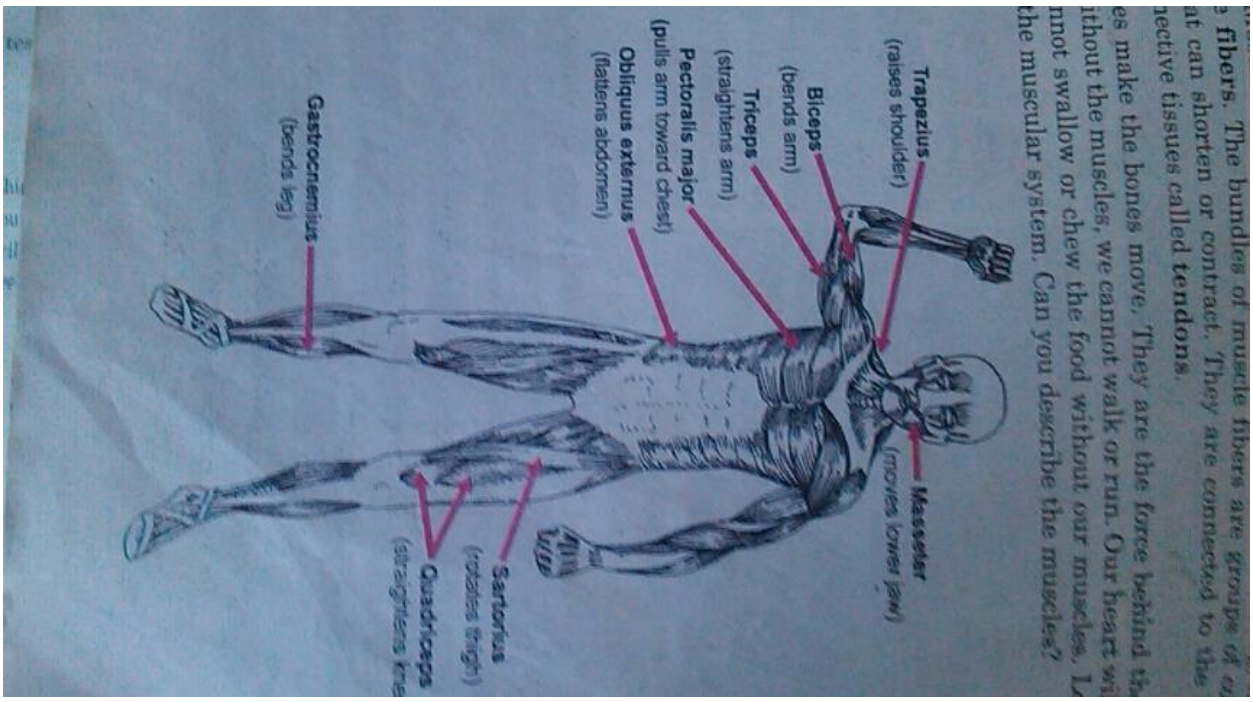
b. muscle strain- painful muscle due to overwork on poorly conditioned muscles.

c. muscle bruise-a muscle injury characterized by blue and black swelling on the skin.

d. torn muscle-a muscle injury due to carrying of heavy load.

e. muscular dystrophy- weakening of the muscle tissues.

f. muscular rheumatism- a muscle pain at the lower back of the body.



C. **Digestive System**- made up of groups of organs that work together to digest food so it can be used by the body.

1. Groups

a. alimentary canal or gastrointestinal tract(MESSLRA)

1.Mouth- food is break down and cut by our teeth.(first digestion)

2. Esophagus- squeezes the food through muscular movement called peristalsis.

3. Stomach- it contains gastric juices help in breaking down proteins and destroying microorganisms in the food.

4. Small Intestines- final digestion takes place through the villi which transfers nutrients to the bloodstream.

5. Large Intestines- undigested food is eliminated as feces/stool.

6. Rectum-collects stool/feces before it is expelled from the body.

7. Anus-the opening through which feces/stool is excreted out of the body.

b. accessory digestive organs(SLPG)

1. Salivary glands- secretes saliva that moistens food and helps in digestion of some carbohydrates.

2. Liver & Gallbladder- secretes bile which aids in digestion of fats.

3. Pancreas(HEP)- secretes pancreatic juices and helps in digestion of carbohydrates, fats and proteins. -also contains hormone and enzymes that regulate blood sugar.

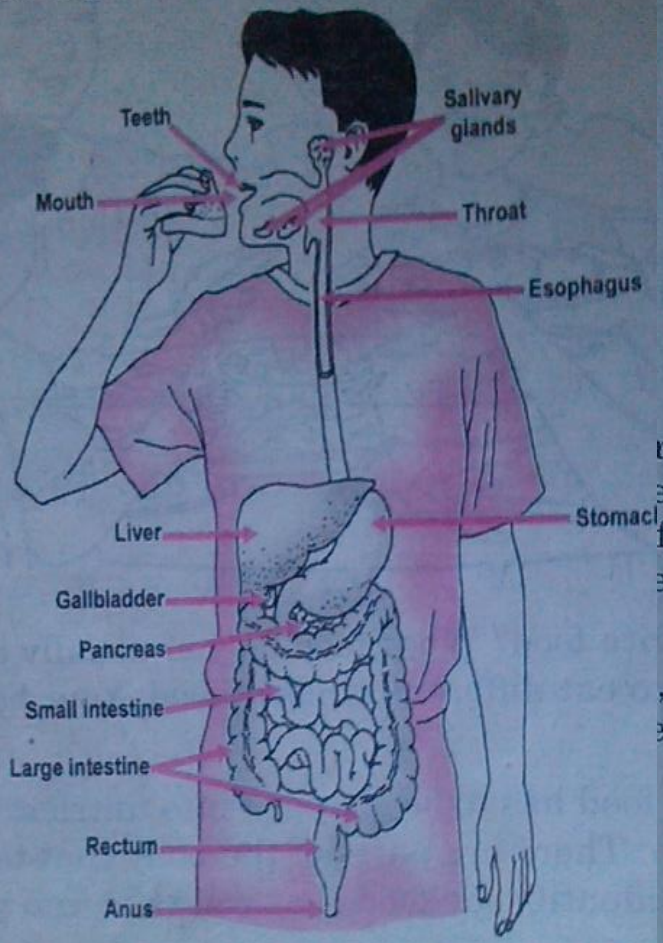
2. ailments/ disorders:

a. tooth decay or dental caries- painful tooth.
b. gingivitis-swelling and redness of the gums
c. diarrhea-loose stool.
d. constipation-difficulty in defecating/ bowel movement.
e. hyperacidity/ Ulcer- gastric pain after drinking liquor.
f. indigestion-pain in the abdomen due to absence of food.
g. gallstones- building up of stones in the gallbladder.
h. heartburn-pain below the heart.

*defecation/bowel movement- elimination of solid waste by the body.

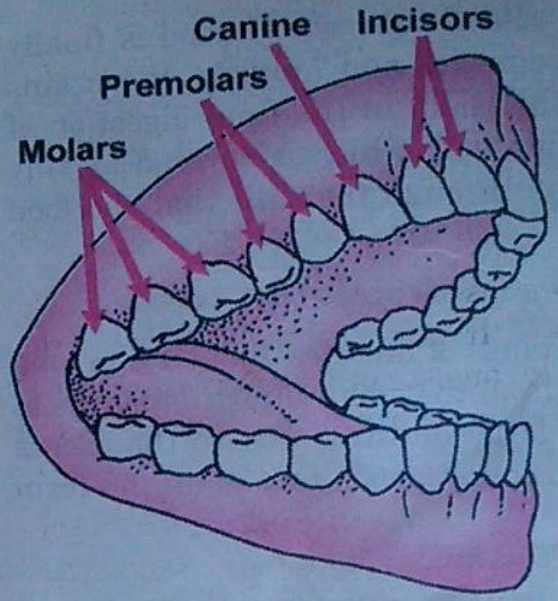
body has to change

the **digestive system.**



The Digestive System

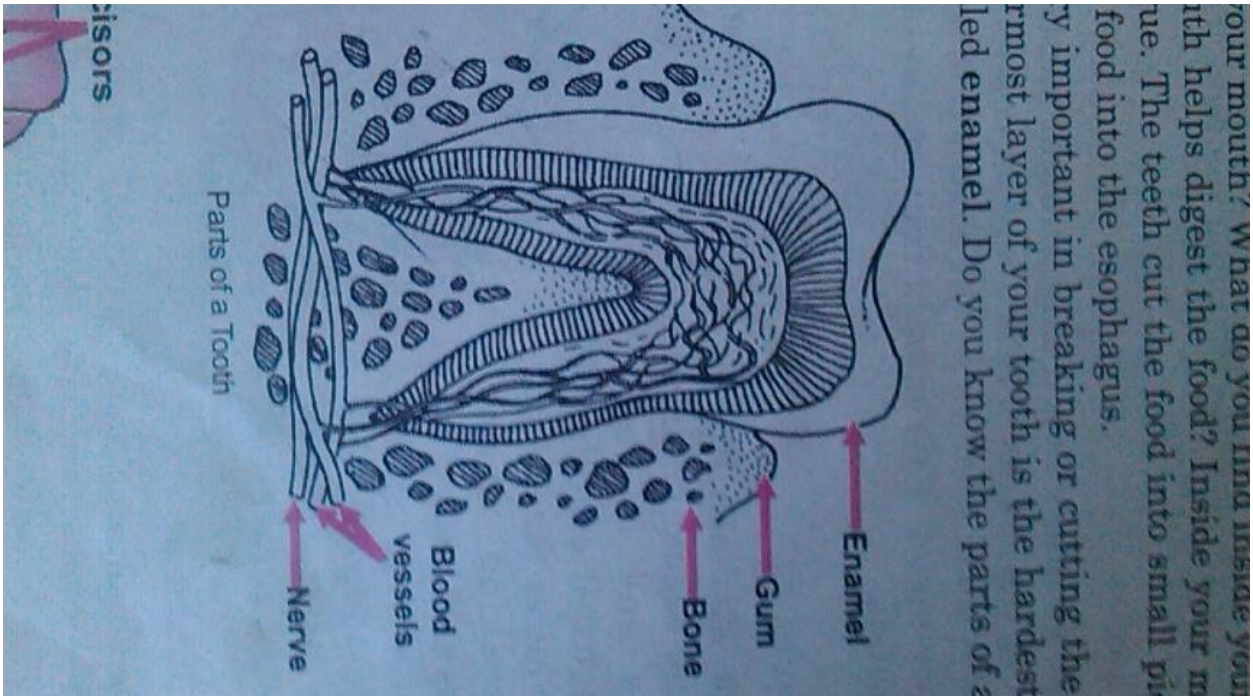
tive system is made up of groups of org
so it can be used by the body. It prov
are important for growth. It consists



The Permanent Teeth

→ bloodstream

Website: http://www



II. Animals

A. Animal Reproduction - vertebrates, animals with backbone reproduce sexually.
-can be hatch or born alive.

1. fertilization -the sperm unites with an egg to produce an offspring.
-can be internal or external.

2.Life cycle/ metamorphosis- major changes an animal goes through during its growth stage.

Examples: <u>complete metamorphosis:</u>

a. Life cycle of a Frog- egg, tadpoles, young adult, adult.
b. Life cycle of a Butterfly- egg, larva/caterpillar, pupa, adult
c. Life cycle of a Mosquito- egg, larva/ wriggler, pupa, adult
d. Life cycle of a Fly- egg, larva, pupa, adult

<u>incomplete metamorphosis:</u>

a. Life cycle of a cockroach- egg, nymph, adult.

III. Plants

A.2 types of Reproduction

a. Sexual reproduction in plants includes flower- bearing and fruit- bearing plants through the seeds. (ex. Eggplant, tomato, okra)

b. Asexual reproduction reproduce through some of their body parts.

1. natural method-

-Bulb-onion - runners-ferns
-tubers-potato - leaves-katakataka
- rhizomes-ginger - shoots-banana

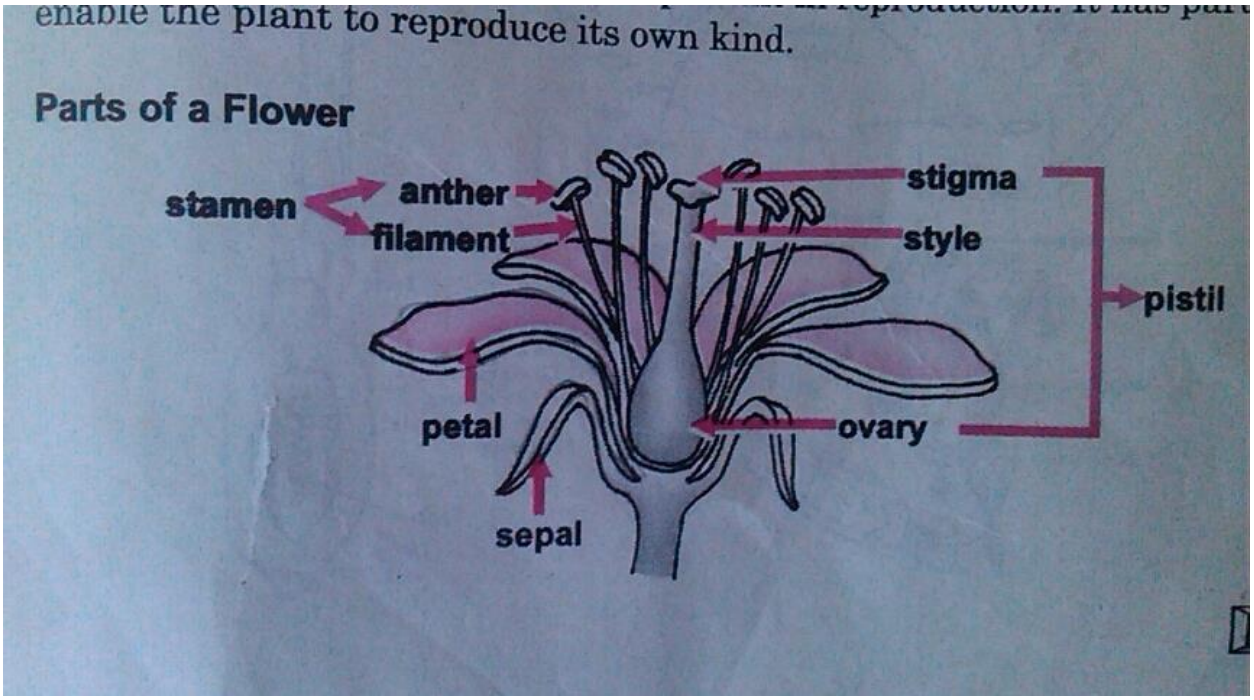
2. artificial vegetative method-

a. Grafting- cutting of stem of a rooted plant(stock) and attaching a branch(scion) from another plant.

b. Marcotting- removing a portion of the bark of a stem and wrapping soil around the cut bark using cloth of husk.
c. layering- covering a portion of the plant stem with soil. The buried stem will grow roots and will be the new plant.
d. budding- make an opening in the stem of the mother plant then the bud from another plant is fitted to the mother plant.
e. cuttings- stem cutting is planted in new location.
f. cloning- this is done through tissue culture.

B. Parts of flower:

1. pistil- female reproductive organ of a plant.(stigma,style, ovary).
2. stamen- male reproductive organ of a plant.(anther, filament).
3. sepals-green leaf-like structures at the base of the petals.
4. petals- attractive colored parts.



C. Types of Pollination- transfer of pollen grains from anther to stigma.

1. self-pollination- transfer of pollen grains through the same flower or of another flower of same plant.
2. cross-pollination- transfer of pollen grains from one flower to another flower of another plant.

D. Parts of the seed- seed coat, embryo and cotyledons

1. seed coat-is the outer covering of the seed that protects the seed from drying up.
2. Embryo-is inside the seed which grows into young plant.
3. cotyledons- provide food to the embryo while still developing.

*monocots-seeds with only one cotyledons.
*dicots- seeds with two cotyledons.

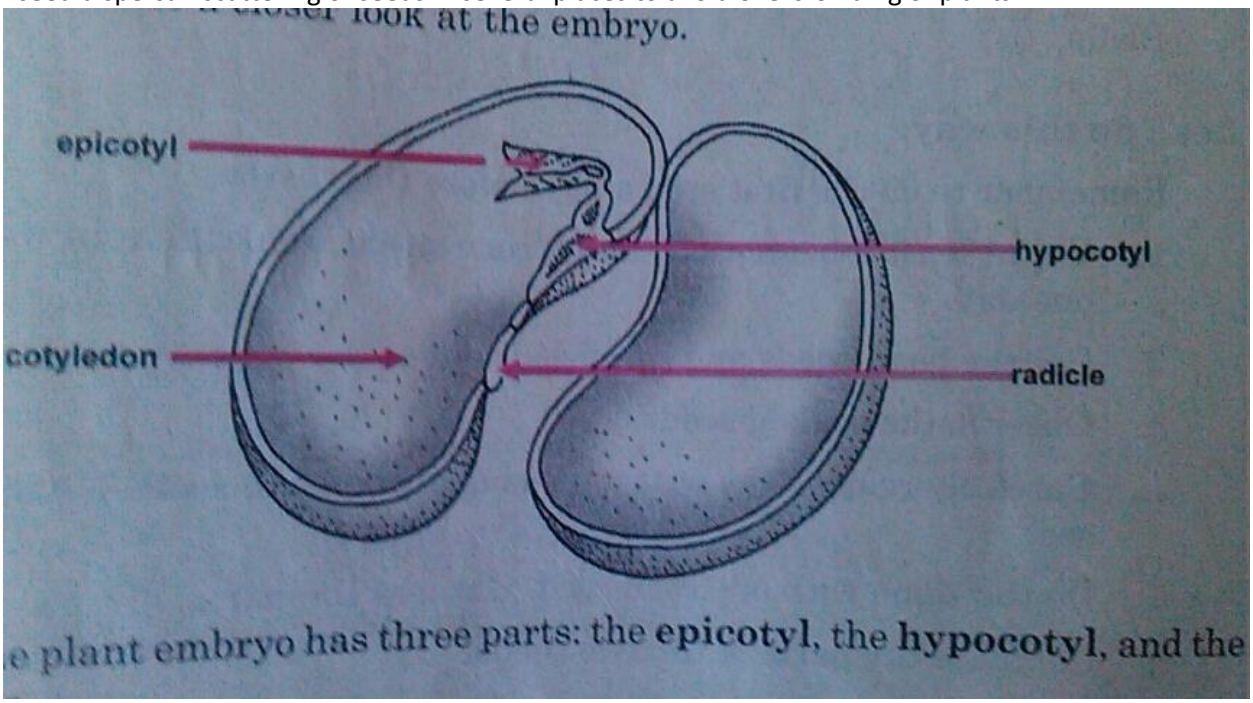
E. Parts of plant embryo:

1. epicotyl- first leaves of new plant.
2. hypocotyl- root stem region.

3. radicle- tip of the hypocotyl which will become the primary root.

*germination- growth of the plant embryo from seed to seedling.

*seed dispersal- scattering of seeds in several places to avoid overcrowding of plants.



Physics

IV. Matter, Energy and Force

A. Energy- ability to do work

1. Two kinds:
    a. Potential- present when not moving.
    b. Kinetic- present when moving.

B. Friction- outside force that resist motion .

-Opoosite to the direction of motion.

1. types:
    a. sliding friction- two surface slide past each other.
    b. rolling friction- object rolls over a surface.
    c. fluid friction- force that resist an object that falls through the air or moves in water.
2. Ways in reducing friction
    a. using lubricants
    b. using wheels and ball bearings
    c. making the surfaces of material smooth.
3. Application of friction:
    a. using brakes in machines
    b. using tires with more threads
    c. using rubber on surfaces that rub together.

C. Heat- a form of energy that can be produced from other forms of energy.

1. types of drying:
    a. solar drying- using the sun as source of heat. (used in dried fish)
    b. mechanical drying- using dryers.
2. effects of heat on matter

a. phase change- solid, liquid, gas
b. heat makes matter expand

3. Temperature- average kinetic energy of the molecules in a substance. Uses thermometer to measure temperature.

Celsius- Farenheit:

$^{O}C = (^{O}F * 5/9) - 32$

Farenheit- Celsius:

$^{O}F = (^{O}C + 32) * 9/5$

4. Heat travel:

a. conduction- transfer of heat through direct contact.
b. convection- transfer of heat through the motion of water and air molecules.
c. radiation- transfer of heat through emission of heat waves or infrared waves through space

5. Fire:

-Fire starts when there is burning of materials.
-3 conditions to start burning are: combustible materials, oxygen and heat.
-combustible materials are easily burn.
-incombustible materials are materials that do not burn.

Chemistry

A. Mixtures- made up of two or more substances that are put together but are not chemically joined.

1. states: Solid, Liquid, Gas
2.. types: a. homogeneous-pag hinalo di agad maipaghihiwalay. (salt+ water, air)
b. heterogeneous-pag hinalo pwede pang ipaghiwalay (pebbles, salt and sand)
3. ways of separating mixture:
a. filtration-using fine mesh screen to filter big from small particles.
b. manual separation- the concept of size is used to separate the big from small.
c. evaporation – when salt solution is heated, water evaporates and the salt remains.
d. settling or decantation- let the mixture settle then pour slowly the liquid on top and the solid (precipitate)remains at the bottom.

B. Solutions- are formed when one or more substances (solutes) dissolved in a liquid (solvent).

1. composition:
a. solutes- sugar, salt,etc
b. solvents- water(universal solvent), gas, etc.
2. types:
a. soluble- can be dissolve
b. semi-soluble- dissolve a little.
C. insoluble- do not dissolve.

*solute dissolves faster by stirring, shaking, heating and powdering or pulverizing.

C. Suspensions- solutes which do not dissolve nor settle down at the bottom form a kind of suspension.

1. types:
a. colloid- contains very small particles that cannot be seen by naked eye.

*Brownian motion- rapid movement and collision with each other.

Earth Science

A. Pollution-Undesirable state of the natural environment being contaminated with harmful substances as a consequence of human activities.

1.pollutantants:

a. land- biodegradable(di nabubulok)waste, non- biodegradable(di nabubulok) waste

b. water-chemicals, used oil, plastic wrappers

c. air- CFCs, sulfur dioxide, nitrogen oxide, carbon dioxide, dust, smoke, pollen

2. effects:

1. global warming

2. acid rain- combination of sulfur dioxide and nitrogen oxide with moist air.

3. ozone layer depletion- ozone layer protects earth from excess UV rays by sun.

-caused primarily by CFCs

B. Soil Erosion- processs of loosening and carrying away soil particles from one place to another.

1. types

a. sheet erosion- the dislodged soil particles are carried by thin sheets of water.

b. gully erosion- running water continuously flow down to lower gorunds carrying with it soil particles and forming gully.

c. glacier erosion- glaciers melt and carries topsoil and other surface materials.

2. effects:

a. changes shape of land

b. lead to poor harvest, lack of food supply, and low income.

c. endanger the lives of peole and animals.

3. ways of preventing soil erosion:

a. terracing- building steps on the slopes of hilly lands using mud or stones.

b. contour farming- plowing the hilly land according to its contours or shapes instead of up and down directions of slope.

c. strip cropping- planting 2 different kind of crops in alternate rows of strips to prevent the washing away of soil particles from the rows of crops.

d. crop rotation- planting crops alternately for every growing season.

C. Weather- refers to condition of the atmosphere in a particular place at a given time.

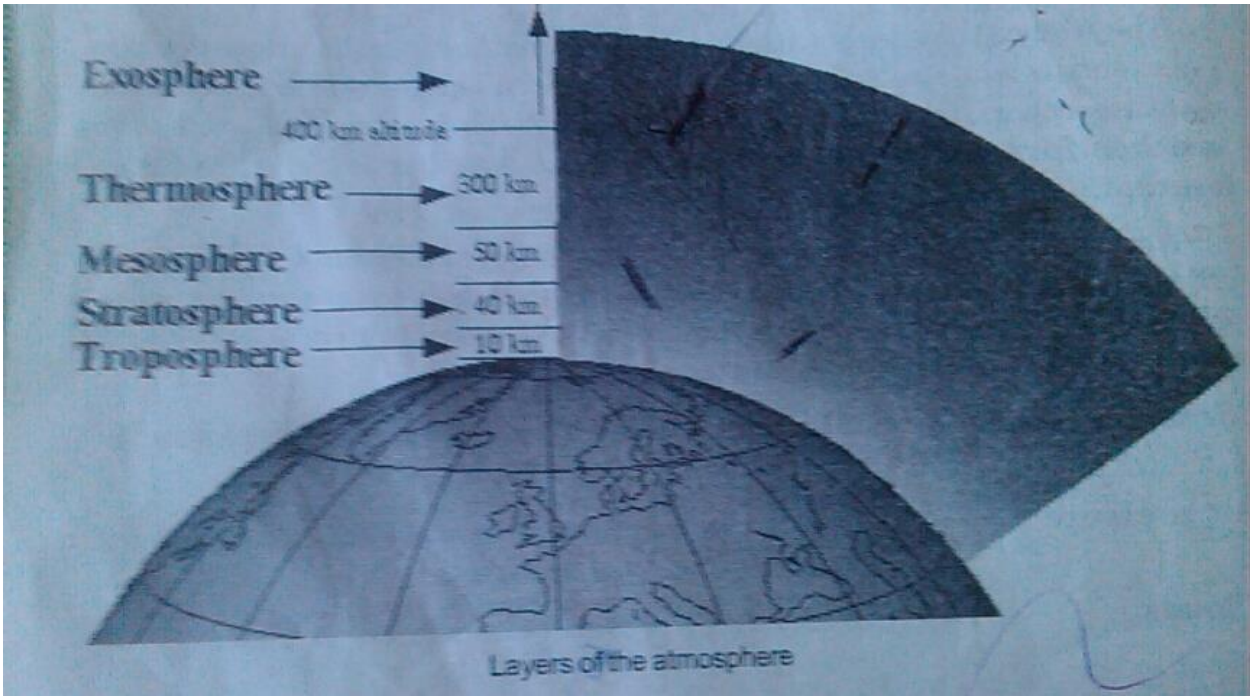
1. Layers of atmosphere

a. troposphere- densest layer where weather occurs.

b. stratosphere- where ozone layer lies.

c. mesosphere-coldest layer of the atmosphere.

d. thermosphere- uppermost layer of the atmosphere.



Layers of the atmosphere

2. weather elements:

a. air temperature- hotness or coldness of air which is measured by the thermometer.

b. air pressure-amount of force exerted by air on the Earth's surface. It depends on the density of the air above it and is measured using barometer.

c. velocity & direction of wind- wind is moving air which is measured using anemometer. Wind direction is determined by using wind vane.

d. amount of cloudiness-

e. humidity- wetness of the atmosphere and measured using psychrometer.

f. precipitation- the water from the atmosphere in solid or liquid forms that fall to Earth. Rain is in form of rain, snow, hail and sleet and is measured by rain gauge.

3. clouds- formed through constant evaporation and condensation of water which eventually fall as rain(precipitation).

a. cirrus clouds- white, thin feathers which tells that weather is fine.

b. cumulus clouds- look like cauliflower with rounded tops and flat bottoms that may bring storm when they pile up.

c. stratus couds- low- lying flat- layered clouds that appear dark gray that may cover the entire sky and look dim. They do not fall immediately as rain.

d. nimbus clouds- are thick and dark clouds also called as rain clouds.

e. combination of clouds- cirro-cumulus, strato-cumulus, alto-cumulus, cirro-stratus, cumulo-nimbus.

* meteorology- the science that deals with the study of weather.
*meteorologist- scientist that study about weather.
*weather forecast- the news about weather.
*atmosphere is the layer of gases that surrounds the Earth.
*clouds are tiny droplets of water suspended in the air.(cumulus, cirrus, stratus, nimbus clouds.)
*the amount of heat that is produced on Earth's surface depends on the angle at which the sun strikes the surface and length of the day.

D. Earth's movement- earth revolves in counterclockwise direction

1. revolution- movement of earth around the sun. It takes 365 days or 1 year for Earth to revolve or to complete its orbit around the sun.(1 year)

2. orbit- circular path where the earth rotates. 1 complete orbit around the sun means one complete revolution.

3. solar year- is exactly equal to 365 days, 5 hours, 48 minutes and 46 seconds.

4.. axis- the point where the earth turn.

5. rotation- movement of earth around its own axis.(1 day)

6. Day and night- because of rotation the other half is lighted and the other half is dark.

7. four seasons: summer, spring, winter, autumn

E. Eclipse-The blocking or partial blocking of light from sun (one celestial body) by moon (another celestial body.)

1. types

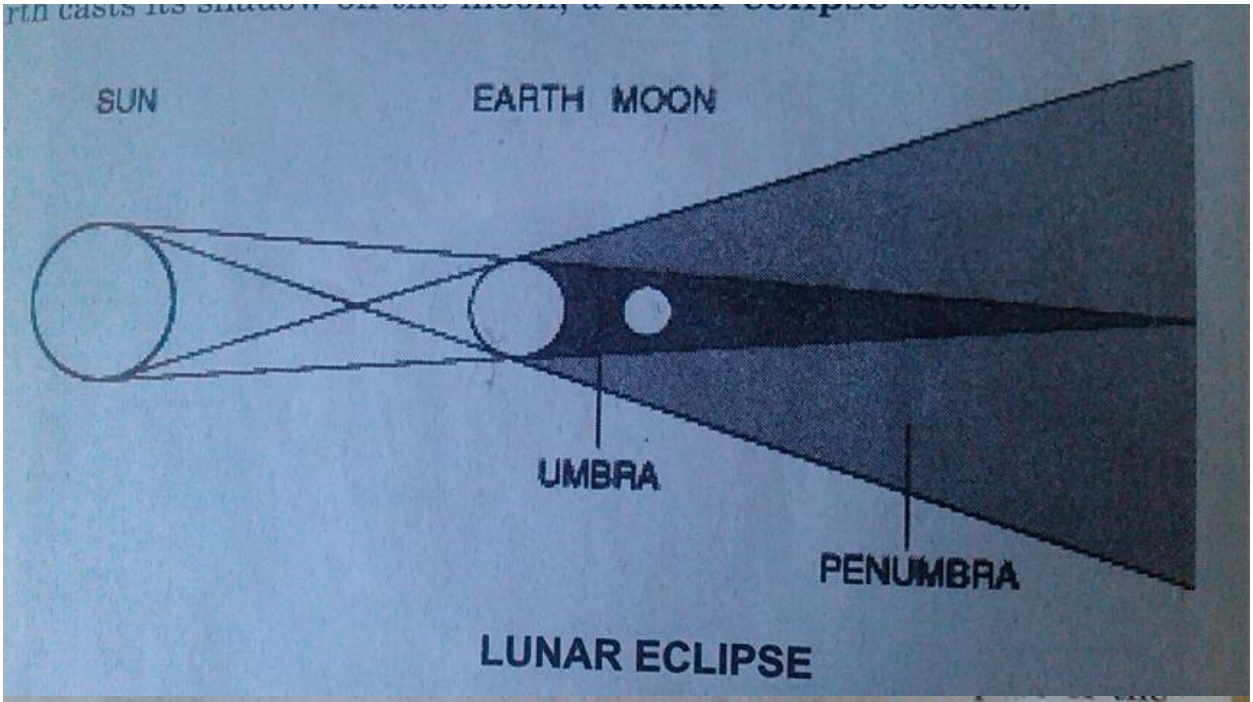
    a. solar eclipse-The moon interrupts light from the sun.

    b. lunar eclipse-The earth interrupts light shining on the moon.

2. parts:

    a. umbra- dark inner part of the shadow.

    b. penumbra- light outer part of the shadow.



LUNAR ECLIPSE

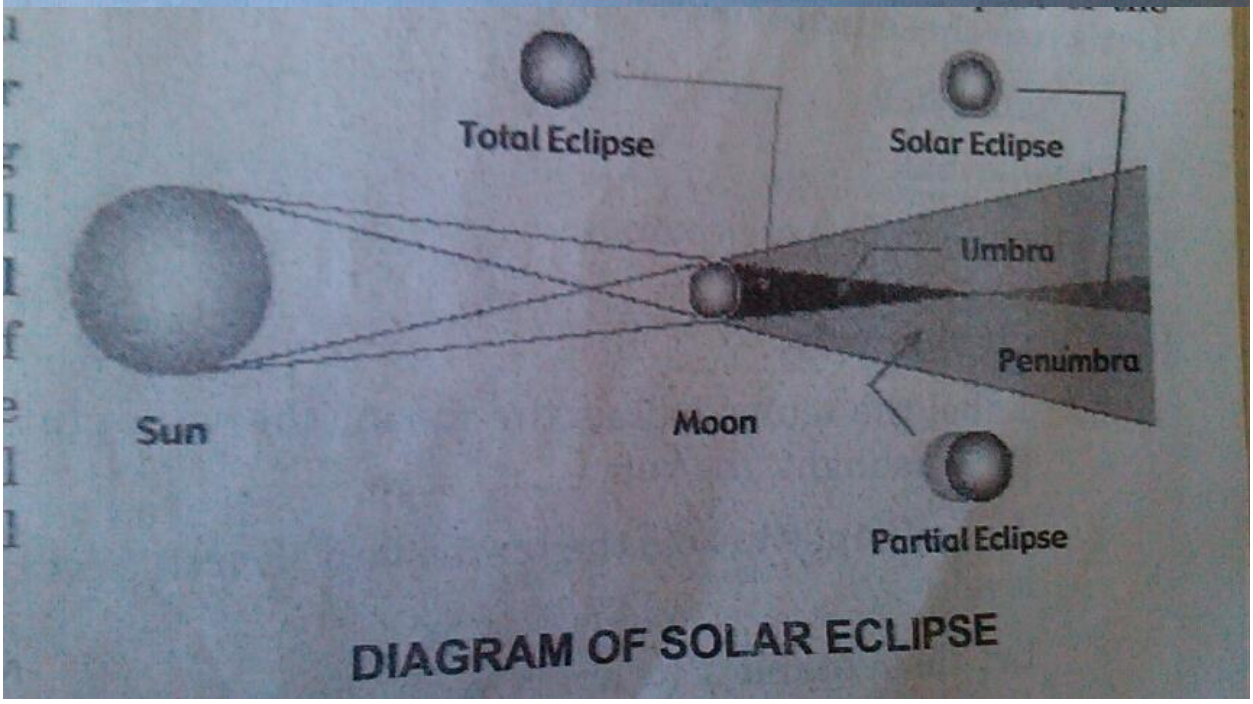
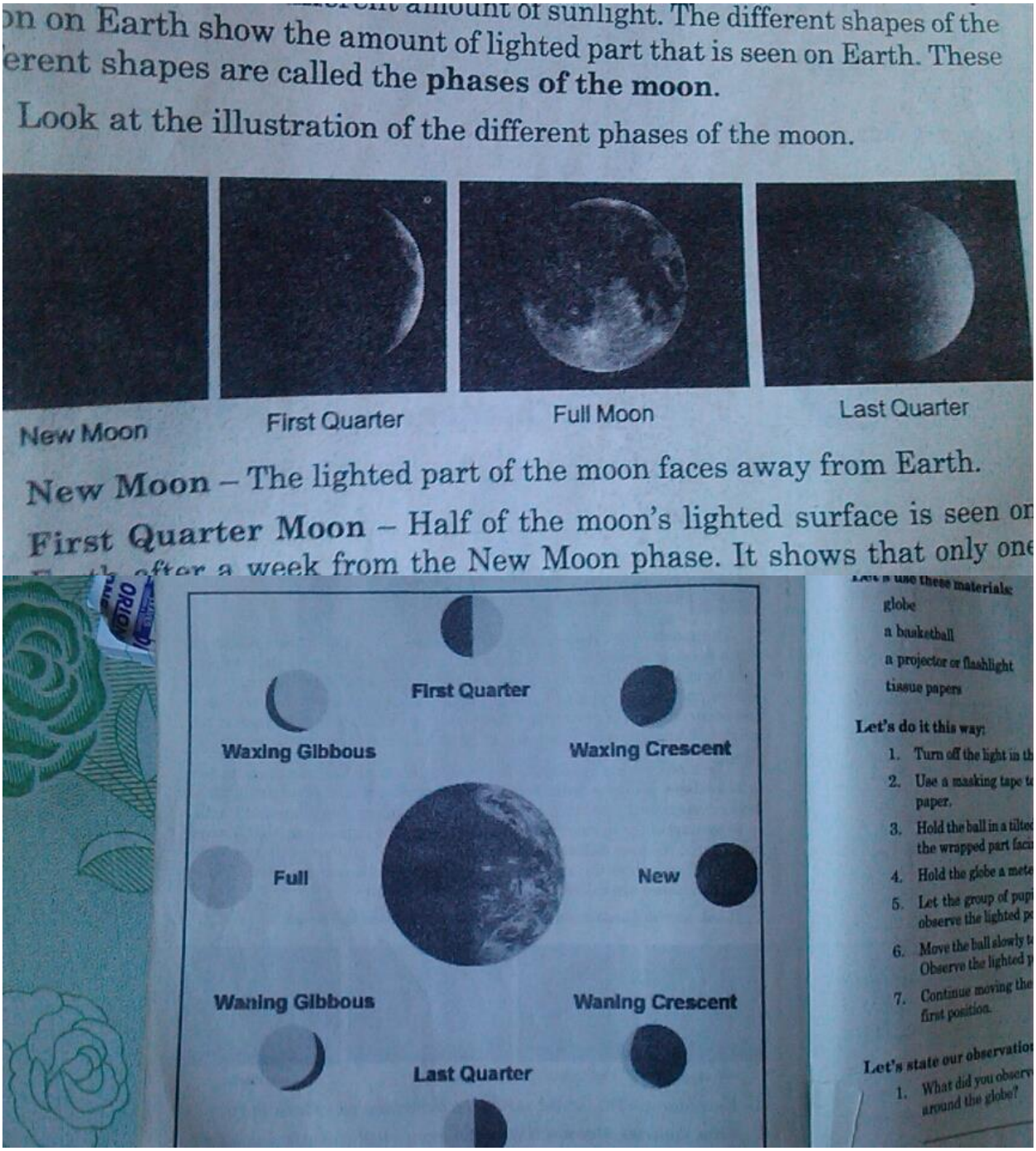


DIAGRAM OF SOLAR ECLIPSE

F. Moon- is the satellite of Earth

- it moves by rotation and revolutions.
- it rotates once in every 29 ½ days or one month
-it completes one recolution in 27 1/3 days or 1 month.
- the moon does not shape but the lighted part change.

1.New moon- lighted part of the moon faces away from earth.
2. first quarter moon- half of moons lighted pat is seen.
3. Full moon- moon is halfway of its orbit. Half part is lighted.
4. Last quarter moon- the moon reached ¾ of its orbit.



English (review application on your phone but do not play!)

A. Nouns
B. Pronouns
C. Adjectives
D. Verbs
E. Adverbs
F. Auxilliary verbs
G. Prepositions
I. Interjections
J. Tenses
K. Phrases
L. Idioms
M. reported speech
N. Active or passive Voice
O. Trial Questions

H. Conjuctions

1. Sentence Completion- read your book and find examples on this.
2. Correct Usage- read your book and find examples on this.
3. Analogy- read your book and find examples on this.
4. Identifying Errors- read your book and find examples on this.
5. Vocabulary- read dictionary everyday. 5 words per day. Use the word in a sentence. Pag di moa lam tignan mo sa merriams dictionary. My examples dun.

6. Reading Comprehension- read your book and find examples on this.

Abstract Reasoning

1. wag eto lagi mong sinasagutan. Madali lang ito kaya wag mo na tong reviewhin.
2. sagutan mo sya ng mabilis. (8 minutes yung sa MSA)