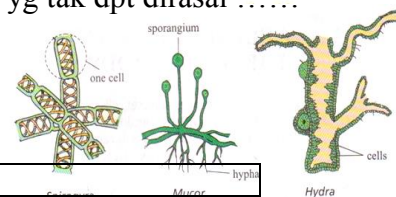
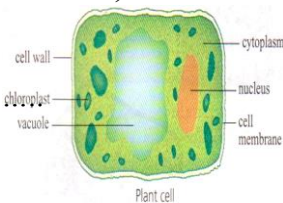


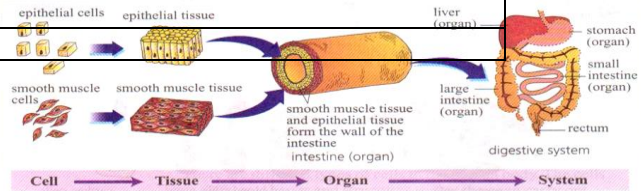
Not@ ringkas ini bukanlah siap sepenuhnya. Jika ada tokok tambah, sila emailkan kepada cikgu sedekahakhirat@yahoo.com dan cikgu akan masukkan ke dalam nota ringkas 'science' PMR ini. Semoga semua pelajar MAHER & rakan pelajar PMR yang lain dapat A dalam Sains PMR dan 'straight A dalam PMR'

NOT@ RINGKAS 'SCIENCE' PMR

1. Apa yang ditanya, JAWAPAN ada dalam soalan. (baca betul-betul apa soalan nak...)
2. **Baca soalan dan fikirkan soalan itu dibawah tajuk APA?**
3. Pemahaman kertas 2
 - i. label
 - ii. fungsi - *mesti tulis nama dulu baru fungsi ...*
4. External caliper – internal caliper = $\frac{ex-in}{2}$ = thickness
5. **Different/beza** – mesti tulis apa beza kedua-dua alat/experiment/observation
6. **Observation** – **jangan senaraikan** yg negative (bukan, tidak), yg tak Nampak, yg tak dpt dirasai
7. **Unicellular** – amoeba, paramecium, euglena, yeast, chlamydomonas, plurococcus
8. **Multicellular** – fish, rabbit, hydra, bird, fern, mucor, spirogyra, moss
9. Chlamydomonas & Euglena – buat Photosynthesis ? buat makanan sendiri..?
10. **CELL**



Cell	Part	Function
Animal CHEEK CELL SALAH	Cell membrane PMR 11	Control substance in/out of the cell.
	Nucleus PMR 11	Control all activities in the cell.
	Cytoplasm	Place chemical process occur. Jelly-like substance contain nutrient.
Plant Onion cell salah	Cell wall	To protect, maintain shape
	Chloroplast	Contain chlorophyll
	Vacuole	Contain cell sap & excretory product
	Nucleus	
	Cell membrane	



11. C.T.O.S.O ? simple → complex (cell, tissue, organ, system, organization)

12. **Matter**

- a. Has mass
- b. Occupies space

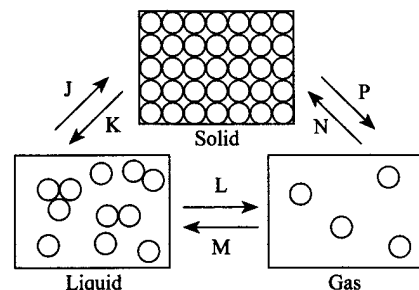
13. **Matter – state** – solid, liquid, gaseous

14. Experiment - Arrange of particles FIKIRKAN JARAK ANTARA PARTICLE

- a. Blue copper (ii) sulphate diffuse into gel – show the solid gel are arrange close together.
- b. Purple Potassium permanganate crystal diffuse into water fairly close together
- c. Reddish-brown bromine gas diffuses quickly into air loosely arranged

15. **K-Melting, L-boiling, L-evaporation, P,N-sublimation – absorb heat**

16. **M-Condensation, J-freezing, – release heat**



17. **Naftalena (ubat lipas)** – rendam dalam air panas untuk leburkan..... very dissolve .. ada trial PMR soal..

18. Density = Mass/volume - formula segitiga spt **V.I.R, P.V.I.** {Power (watt)=Voltage (V) x Current (A)} lihat no 94

19. Denser – sink & Less denser – float (liquid or solid) **INGAT pada nombor besar dibawah dan kecil di atas. Perlu susun tanpa mengira solid, liquid atau gas.**

20. Air batu terapung kenapa? **Volume expand.** Tanya cikgu bagaimana? Nak tulis payah...

21. Resources – element, compound, mixtures. **BEZA** apa ya ???

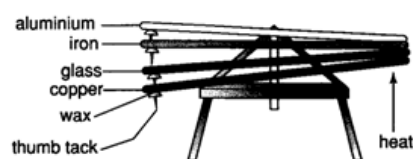
22. **Element** – one type of particles (metal & non-metal)

23. Metal → heat – **expand, particles vibrate faster, space between particles increase**

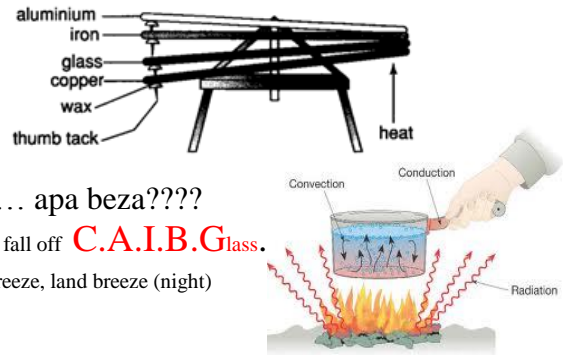


A, B, C, I, Z, I - aluminium, brass, copper, iron, zinc, invar (expand decending order)

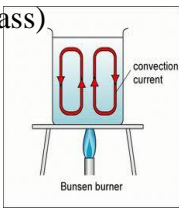
CHECK -conduction fall – heat flow through **solid** – thumbtacks at the rod fall off **C.A.I.B.Glass.**



- c. potassium hydroxide solution - absorb CO₂
- d. Soda Lime - absorb CO₂
- e. **Pyrogallol** - absorb O₂ – tingkatan 1
- f. hydrogen carbonate indicator - test presence of CO₂ (red to yellow - acid) lihat experiment rokok
- g. bicarbonate indicator - test presence of CO₂ (red to yellow - acid)
- h. blue litmus solution - test presence of CO₂ (blue to red- acid) lihat text book form 3
- i. anhydrous calcium chloride - absorb water vapour
- j. acidified potassium manganate (VII) - test presence of sulphur dioxide – purple to colourless (acidic gas – menukarkan Blue Litmus Paper to Red TETAPI... lime water tidak boleh guna??? Tidak berubah warna)
- k. acidified potassium dichromate (VII) – to test sulphur dioxide – orange to green
- l. potassium manganate crystal (VII) - supply oxygen – chp 6 F3
- m. dilute sulphuric acid - electrolysis – more/better conduct electricity
- n. dilute hydrochloric acid - kill bacteria in food (stomach)
- o. distillation - kill microorganism in water remove suspended substances & dissolves substances
- p. chlorination - kill microorganism in water
- q. boiling - kill microorganism in water
- r. decomposer - bacteria & fungi
- s. fungi – decompose dead **plant**
- t. bacteria – decompose dead **animal**
- u. water displacement method - siphon ..? check apa beza????
- v. conduction (fall) – heat flow through solid – thumbtacks at the rod fall off **C.A.I.B.Glass.**
- w. convection - heat flow through liquid or gaseous –sea breeze, land breeze (night)
- x. radiation - heat flow through light – vacuum – sun
- y. condensation - changing gas to liquid - distillation
- z. sublimation /pemejalwapan (solid changes directly into gas without melting first and vise versa) ex iodine crystal change to purple iodine vapour when heated



- aa. coal – arangbatu (keluar water) , charcoal - arang
- 40. conduct of heat (expand) **A, B, C, I, Z, I, G** (Aluminium, Brass, Copper, Iron, Zinc, Invar, Glass)
- 41. Pipette – measure fixed/specific volume 10cm³, 25cm³, 50cm³
Burette – measure accurate 0.1cm³
- 42. **REPLACE** - Sodium Hydroxide Solution @ Potassium Hydroxide Solution (absorb CO₂)
- **Benedict** – Fehling solution (test presence of glucose) & Egg white – albumen
- a. **Sensitivity of skin** - Thickness of the epidermis b. number of receptor



43. Jus gaster

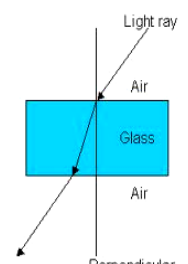
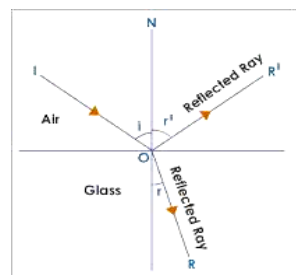
- a. dilute hydrochloric acid – kill bacteria in food
- b. enzyme (Gastric juice) jus gaster
- i. **renin** - coagulate milk - liquid milk → solid milk
- ii. **pepsin** - digests protein → peptone→ amino acid

44. DIGESTION

- 1. mouth - starch - amylase (saliva) **jadi Maltose/Glucose**
- 2. stomach/duodenum - protein - pepsin (digest protein)
- 3. small intestine - protein - renin - coagulate milk
- starch - **protease** - amino acid
- Fat - **amylase** - glucose
- **lipase** - fatty acid + glycerol

45. Deficiency

- a. Vitamin C - scurvy – bleeding gum **A.D.E.K.** - vitamin soluble in fat **B.C.** - vitamin soluble in water
- b. Vitamin D - rickets (weak bones)
- c. Iron - anemia (pucat)
- d. Protein - kwashiorkor – stunted growth



e. Fiber/H₂O - constipation

46. VERSE

- a. Weight (Newton) VS mass (Kg)
- b. Air pressure (HP → LP) VS water pressure (turgidy of cell)
- c. REFLECTION VS REFRACTION
- d. short-sightedness VS long-sightedness figure – beza short/long
- e. monocular vision vs stereoscopic vision (kebaikan pada monocular kelemahan pada stereoscopic dan sebaliknya)
- f. warm blooded vs cold blooded – warm – body temperature remain constant/not change with surrounding temperature
- g. hydrotropism, phototropism, geotropism, thigmotropism. – move toward stimuli, nastic movement – move away
- h. exhalation vs inhalation) **ingat** (Thoracic Cavity berhubung songsang dgn air pressure): **inhale** – TC increase, AP decrease
raTA TArik - diaphragm
- i. acid vs alkali (ingat pH atau masam/pahit) HURUF **ACID ALKALI**



j. evaporation vs boiling (temperature, whole/only surface)

k. melting vs dilute (lebur & cair) kehidupan harian

l. OPTICAL ILLUSION ----->

m. heat vs temperature

iii. heat is energy

iv. temperature is the degree of hotness or coldness

n. incident ray vs reflected ray cara kira sudut mesti dari Normal line

o. hydrochloric acid vs dilute sulphuric acid

p. bright room to dark room (pupil yang berubah...kecil to besar)

47. FACTOR

- a. Short-sightedness & Long-sightedness - 2 **factors** – eye ball is too long/short, eye lens is too thick/thin
- b. balance diet - 5 – sex, occupation.....
- c. evaporation - 3 – wind, surface area, temperature
- d. air pressure - 3 – volume of gas, size of container, temperature
- e. buoyancy of water - ability to move/float in water
- f. **TURGID** – water in it is exerting pressure outwards in all direction (turgidity of water)
- g. **AQUATIC PLANTS** – erect in water because they are supported by the buoyancy of water
- h. Stability - 4 – centre of gravity, base area
- i. Exchange of gases efficient in alveolus - 3 thin, many blood capillary,
- j. Diffusion end product of digestion (villi) - 3 factors
- k. Lung damage - 3 factors
- l. Transpiration - 5 factors. light, temperature, humidity, air movement, surface area
- m. Magnitude of force – nature (rougher), weight. **Except** – size of surface contact (base area contact) **Can measure using S.B.**

48. SAME NAME

- a. 3 bones - ossicles - hammer, anvil, stirrup
- b. Water – water vapour
- c. Fat layer – subcutaneous layer – adipose layer

49. SAME FUNCTION

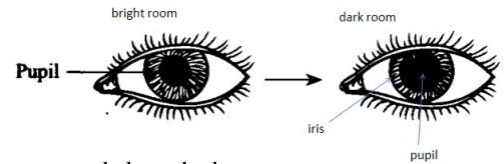
- d. Benedict - Fehling - test presence of glucose
- e. Albumen - egg white - protein

50. TAKE CARE

- a. Combustion - carbon + oxygen -----> CO₂ + heat energy + light energy
Hydrocarbon/alcohol -> CO₂ + **water** + heat + light energy
- b. **Lime juice** - air limau – acid – litmus paper **blue to red**
- c. **Lime water** - air kapur – alkali- (calcium hydroxide solution pH 12.5)
- d. **Soda lime** - **absorb** Carbon Dioxide

- e. CFC - Penipisan Lapisan Ozon
- f. Sulphur Dioxide - hujan asid
- g. CO₂ - pemanasan global (global warming – kesan rumah hijau)
- h. Yellow spot - Blind spot -
- i. Aqueous humour - Vitreous humuor -
- j. Convex lens - Concave lens -
- k. Pupil - control light entering the eye (anak mata) Iris - control size of pupil (mata hitam luar)
- l. Platypus – mammal salamander - Shark - ?.....

- m. Milk of magnesia (alkali), fresh Milk (acid)
- n. **PREY –PREDATOR betul, predator-prey salah**
- o. **LEVER KELAS 1 – SALAH ???**



51. Check?

- a. Semi circular canal - not involve in hearing - to balance body
- b. Eusthian tube - not involve in hearing - to balance both side of the ear/AIR PRESSURE
- c. Liver - produce bile – stored at gall bladder (**DIGESTION & EXCRETION**)
- d. Pancreas - produce 3 type of enzyme (Protease, Amylase, Lipase)
- 52. SENSITIVITY OF THE SKIN – 1. Thickness of the epidermis 2. Number of receptor present
- 53. SENSITIVITY OF THE NOSE -1. Strength of smell 2. Presence of mucus
- 54. **AIR PRESSURE - H.P. → L.P.**
- 55. **INTERACTION** – symbiosis (commensalism, mutualism, parasitism), prey-predator, competition

Commensalism – bird’s nest fern-tree, remora-shark, mutualism – sea anemone-hermit crab, nitrogen fixing bacteria-leguminous plant

56. CHARACTERISTICS

- a. Image form in the retina - 3
- b. Tropism - move towards stimuli
- c. First class, second class, third class lever - **‘F.L.E’**. (Jika tulis Kelas 1 – salah)
- 57. Resovoir → coagulation (alum/slake lime) → mixing tank → sedimentation → filtration → chlorination → storage → supply
- 58. (cleanest) Rain water → spring w → well w → river w → pond w → sea w (dirtiest)

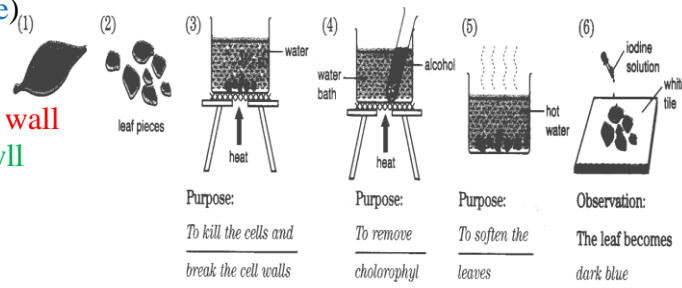
59. TEST

- a. Test acid
 - 1. litmus paper - **Bas MERAH**
 - 2. pH paper - 0 < 7 > 14
 - 3. universal indicator -
- b. Test alkali
 - 4. litmus paper -
 - 5. pH paper - 0 < 7 > 14
 - 6. universal indicator -
- c. Test glucose – **Benedict solution** - brick red precipitate - **HEAT** (**FEHLING SOLUTION**)
- d. Test protein – Millon`s reagent - brick red precipitate - **HEAT**
- e. Test starch – **iodine solution** - dark blue
- f. Test fat – alcohol/ethanol/**FILTER PAPER** - milky mixture/emulsion/translucent spot
- g. Test water – Anhydrous cobalt chloride paper – blue to pink
- h. Test water - Anhydrous copper sulphate (white → blue)



60. Test presence of starch in the leaf

- a. Boil leaf - to kill/break the cell wall
- b. Boil in alcohol/ethanol - to remove chlorophyll
- c. Place in hot water - soften the leaf
- d. Iodine - to test starch



61. PURPOSE

- a. 37⁰ C - human body temperature – experiment Visking Tube
- b. Chlorine - kill microorganism in water
- c. dilute hydrochloric acid - kill bacteria in food
- d. Chloride - prevent tooth decay
- e. Lime (slaked lime) - reduce acidity of water
- f. Alum (Aluminum Sulphate) - coagulate the suspended particles
- g. Anhydrous Cobalt chloride paper - to test presence of water - blue to pink
- h. Phenolphthalein indicator - (pink to pale pink)to test presence of water? During neutralization process ... tak perlu hafal
- i. universal indicator - to test presence of water - purple to yellowish green - neutral
- j. anhydrous copper sulphate - to test presence of water (transpiration) white to blue
- k. universal indicator -to test acid or alkali- green to yellow – acid

62. Indicator

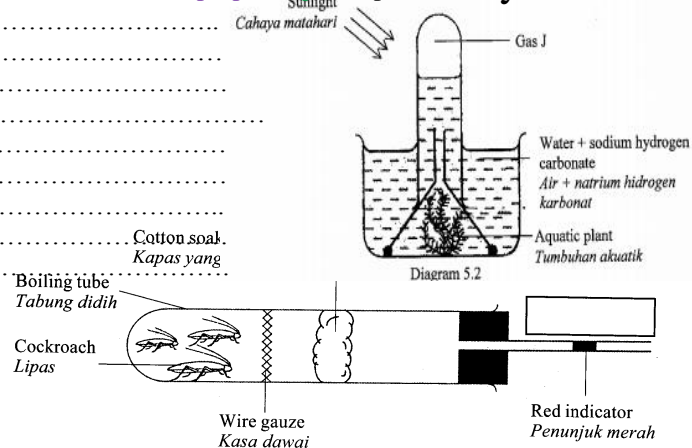
Name of indicator	Acid	Neutral	Alkali
Litmus paper	Red	Purple	Blue
Phenolphthalein	Colourless	Merah jambu pucat/Pale Pink	Merah jambu/pink
methyl Orange	Pink	Orange	Yellow
Universal indicator	Red/pink/orange/yellow	Yellowish Green	Bluish purple/purple

• Phenolphthalein & methyl orange tidak termasuk dlm sukatan pelajaran – tak perlu hafal.....

Neutralisation Process, Titration Method

1. acid + Alkali = nama baru (alkali + acid) + water (salty)

- a. hydrochloric acid + Sodium hydroxide = universal indicator (purple to green) pH 7, salty
- b. Hydrochloric acid + potassium hydroxide =
- c. Hydrochloric acid + sodium hydroxide =
- d. Hydrochloric acid + calcium hydroxide =
- e. Hydrochloric acid + ammonium hydroxide =
- f. Sulphuric acid + ammonium hydroxide =
- g. Sulphuric acid + potassium hydroxide =
- h. Sulphuric acid + sodium hydroxide =
- i. Nitric acid + calcium hydroxide =
- j. Nitric acid + sodium hydroxide =



63. Supply Carbon Dioxide

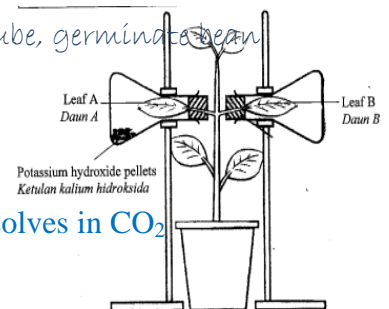
- a. Potassium bicarbonate – CO₂
- b. Sodium bicarbonate - CO₂
- c. sodium hydrogen carbonate – ujian photosynthesis

64. Absorb carbon dioxide

- a. Potassium hydroxide solution – experiment daun - photosynthesis
- b. Sodium hydroxide solution – experiment photosynthesis, lipas dalam test tube, germinata bean
- c. Soda lime – dalam tong oksigen menyelam scuba

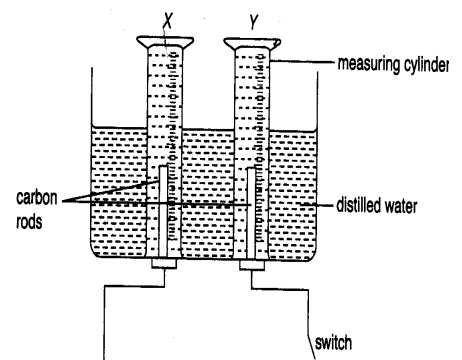
65. To detect carbon dioxide

- a. Bicarbonate indicator (red to yellow)
- b. Lime water (turns cloudy) – calcium carbonate
- c. Sodium hydroxide solution (S H S rises to fill up to the test tube) - very dissolves in CO₂
- d. Burning Wooden splinter – goes out/burns out
- e. Level of water – rises up ... sama spt oxygen (20 %)
- f. Hydrogen carbonate indicator – red to yellow –acid
- g. Litmus paper (blue to red) – acid
- h. Alkaline Pyrogallol solution – not dissolve in CO₂ (O₂ very dissolve)



Tumpang sekaki.....

- a. Pyrogallol - absorb O₂ – tingkatan 1



- b. Chlorophyll – to absorb light energy
- c. Photosynthesis – light energy → chemical energy
- d. Rat 1 : owl 2 → **competition**, rat 1 : owl 1 → **prey-predator/biological control**

- 66. Solution - dilute, concentrated, saturated
- 67. Saturated – nak `dilute`kan **1. Add more water** **2. Heat**

68. Electrolysis of water

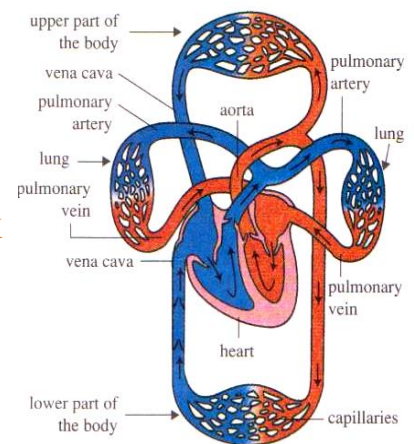
- a. terminal Panjang – Positive - Oxygen – Anode
- b. terminal pendek hydrogen
- c. dilute sulphuric acid to ...more conduct electricity
- d. electrolysis – to break down molecule of water (water consist two atom hydrogen & one atom oxy)
- e. distillation – remove suspended substances & dissolves substances.

69. to absorb water vapour

- a. **calcium chloride crystals/pellets** - drying agents
- b. **silica gel** - drying agents - dlm kasut
- c. Test water – cobalt chloride paper – **blue to pink**
- d. **anhydrous calcium chloride** - absorb water vapour (solid)
- e. test water - Anhydrous copper sulphate - white - **blue**
- f. test water - Anhydrous Cobalt chloride paper - **blue-to-pink**

70. BLOOD CIRCULATION

- a. Salur darah pada jantung - VC-PA-A-PV
- b. Artery-blood out of the heart, HP, lumen-small, **vein** – blood into heart, LP, lumen-large
- c. Valve – tv, sv, sv, bv.
- d. H – L – H – pulmonary circulation
- e. H-ALL-H – systemic circulation



71. Excretory

Aorta --→ renal artery --→ kidneys --→ renal vein (orang normal/kidney failure dialysis sama shj)
Artery vena cava

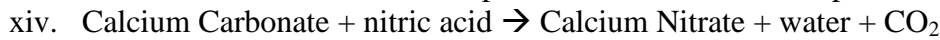
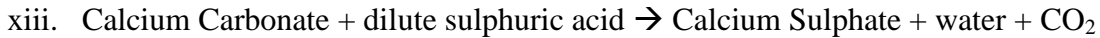
72. To test presence of

- a. **Oxygen**
- v. Glowing wooden splinter - burst into flame - ignite
- vi. Burning wooden splinter - more burning /brighter
- b. **Carbon dioxide** – lime water – chalky dan banyak lagi di no? check Litmus Paper **Blue to Red**
- c. **Sulphur dioxide** (INGAT – lime water bukan untuk menguji Sulphur Dioxide, walaupun Sulphur Dioxide bersifat acidic)
- vii. Acidified potassium manganate VII - **purple to colourless**
- viii. Ingat tak ... satu lagi ... dichromate...
- d. **Water**
- ix. Anhydrous copper sulphate - white - **blue**
- x. Anhydrous Cobalt chloride paper - **blue** - to - **pink**
- e. **Hydrogen**
- xi. Burning wooden splinter - it produce `pop sound`

1.Lime stone/marble	Calcium carbonate	Calcium, carbon, oxygen
2.Quick lime	Calcium oxide	Calcium, oxygen
3.Slaked lime	Solid calcium hydroxide	Calcium, oxygen, hydrogen
4.Lime water	Calcium hydroxide solution	Calcium, oxygen, hydrogen

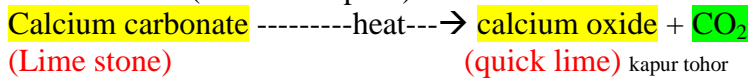
73. Properties of Calcium Carbonates (Calcium, carbon, oxygen)

- a. Calcium carbonate – not dissolve in water
- b. Reaction with acid
- xii. Calcium carbonate + hydrochloric acid -----→ calcium chloride + water + CO₂



INGAT - SEPERTI NEUTRALISATION ???? bezanya keluar CO₂

c. Effect of heat (will decompose)

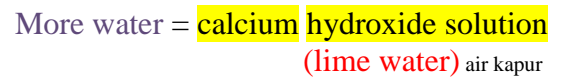


Batu kapur

+
Water



+



The effect of heat on some mineral		
The effect of heat on carbonates (carbon dioxide is released)	The effect of heat on oxides (oxygen is released)	The effect of heat on sulphides (sulphur dioxide is released)
Turn lime water milky Extinguished burning splinter Changes red bicarbonate indicator to yellow	The glowing splinter will burn brightly	Bleaches acidic purple potassium manganate (VII) colourless Converts orange acidic potassium dichromate (VI) to green. <i>(INGAT – lime water bukan untuk menguji Sulphur Dioxide, walaupun Sulphur Dioxide bersifat acidic)</i>

74. Tindak balas

- a. Acid + metal - hydrogen (pop sound)
- b. Acid + carbonated - carbon dioxide (turn lime water cloudy/chalky)
- c. Water + CO₂ -----chlorophyll/sunlight-----→ O₂ + glucose

75. Moh's Scale

Moh's scale	hardness value	Clue
Talc (softest)	1	Tarzan
Gypsum	2	George
Calcite	3	Can
Fluorite	4	Force
Apatite	5	A
Feldspar	6	Fat
Quartz	7	Queen
Topaz	8	To
Corundum	9	Carry
Diamond (hardnest)	10	Diamond

76. Solubility in water except – potassium & sodium

77. Effect of heat

- a. Metal carbonate
 - xv. Except potassium carbonate, sodium carbonate
 - xvi. CO₂ – lime water cloudy
- b. Metal oxide
 - xvii. Except mercury oxide, argentums oxide
- xviii. O₂ – ignites glowing wooden splinter
- c. Metal sulphide
- d. Sulphur dioxide (INGAT – lime water bukan untuk menguji Sulphur Dioxide, walaupun Sulphur Dioxide bersifat acidic) – air kapur tak keruh
 - acidic potassium manganate (VII) – purple to colourless

- acidic potassium dichromate (VII) orange to green.

78. Metal React with O₂ – M.A.Z.I. (decending order) I.Z.A.M (accending order)

- a. Iron + O₂ -----heat → iron oxide
- b. Zinc + O₂ -----heat → zinc oxide
- c. Copper + O₂ -----heat →
- d. Lead + O₂ -----heat →

compound

magnet tak boleh 'attract' dah

79. Metal React with sulphur – M.A.Z.I. (accending order)

- a. Metal + sulphur -----heat → metal sulphide
- b. Copper + sulphur -----heat →? apa jawapan ..
- c. Lead + sulphur -----heat →
- d. Iron + sulphur ---- heat →

80. Silica - silicon + O₂ -----heat-----→ silicon dioxide or silica

- a. Properties
 - i. Does not break down when heat
 - ii. Does not react with dilute acid
 - iii. Insoluble in water

iron – element
magnet boleh 'attract'

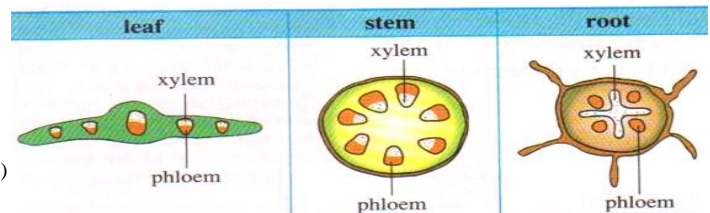
81. Blood

- i. O - universal donor - for leukemia, haemophilia, surgery
- ii. AB- universal recipient
- iii. Transfusion - process transferring blood
- iv. Agglutination - two incompatible group - lead to dead
- v. Sodium citrate - prevent blood from coagulating

Blood group	CAN DONOR	Blood group	CAN RECEIVE	Blood group
A, B, AB, O	←	O	→	O
A, AB	←	A	→	A, O
B, AB	←	B	→	B, O
AB	←	AB	→	A, B, AB, O

82. Transpiration - Function stomata (guard + stoma)

- i. Release oxygen – photosynthesis
- ii. Release water – transpiration
- iii. Release Carbon dioxide - respiration

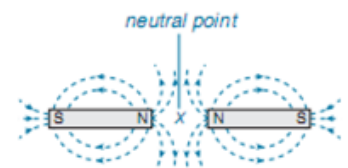


83. Phloem – Outer – food - lack – swollen – died (bahagian bawah)

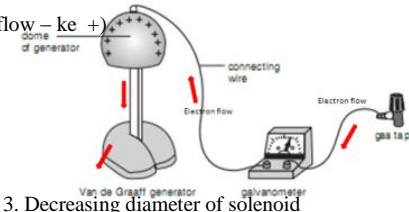
84. Xylem – mineral salt & water

85. To measure –

- a. VIR - series $I_T = I_1 = I_2$ & parallel $V_T = V_1 = V_2$
- b. Current - Ammeter (dipasang secara Series) - unit Ampere
- c. Voltage - Voltmeter (dipasang secara selari) - unit Volt
- d. galvanometer - (to detect current)
- e. Transpiration - photometer
- f. Air pressure - Barrow meter, Pressure Gauge, Bourdon Gauge ada lagi alat yang mengukur pressure
- g. Puncak bukit - low pressure, kaki bukit - high pressure
- h. Length - opisometer
- i. Irregular shape - water displacement method
- j. Temperature - thermometer
- k. Weight - spring balance, compression balance
- l. Mass - bb, lb, cb



- 86. Excretion - kidney - **ureter** - urinary bladder - **urethra** (ingat **URETERHRA**)
- 87. **Electromagnet** dome - +ve, galvanometer – detect electron flow @ current flow.
 - a. **Right hand grip rule** – ibu jari (tunjuk arah current flow) + ke - jari lain – magnetic field (electron flow – ke +)
 - NAK TAMBAH magnetic field – tambah current flow
 - NAK TUKAR MAGNETIC FIELD – tukar current flow BUKAN ELECTRON FLOW
 - b. Direction magnetic field – **N → S**



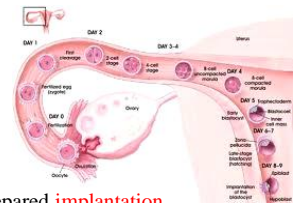
- 88. GALVANO METER – electron flow ... -VE → + VE
- 89. Solenoid – increased strength magnetic field
 1. Increase turn wire
 2. Increase electric current
 3. Decreasing diameter of solenoid

90. REPRODUCTION

- a. Sexual - human, frog, rabbit (internal + external fertilisation)
- b. Asexual - amoeba, paramecium
 - binary fission - amoeba, paramecium, euglena
 - budding - hydra, tape worm, yeast
 - spore formation - mould, mosses, fern
 - vegetative - galangal, sweet potato, strawberry, onion, yam, banana (rhizome, tuber, runner, bulb, corm, & sucker)
 - regeneration - flat worm, starfish

91. PHASE IN MENSTRUAL

- a. 1-5 days - menstruation phase - ovum & blood cell are discharged
- b. 6-11 days - repair phase - the lining of the uterus thickens
- c. 12-16 days - fertile phase - ovulation/bertelur (days 14 menjadi)
- d. 17-28 days - pre menstrual phase - the uterine wall thick & rich with blood vessels. Prepared implantation



92. CONCEPT in reproduction

- a. Menstruation - blood discharge - 7 hari
- b. Ovulation - process releasing ovum from the **ovary** - hari ke 14
- c. Fertilization – process of fusion between the nucleus of **sperm & an ovum** in the **fallopian tube**
- d. Implantation – process **embryo** sticking to the **uterine wall**

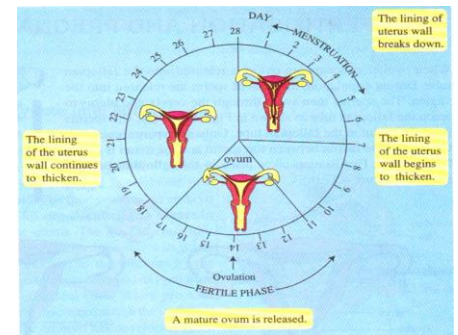
93. Zygote – embryo – fetus – baby – infancy – childhood – adolescence – adulthood – old age

94. **HUMAN GROWTH** – rapid – slow – rapid – minimal – negative

95. Between 12-14 the growth girl exceed boy (a girl reaches puberty earlier than a boy)

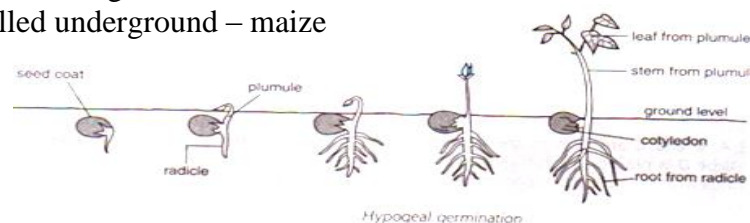
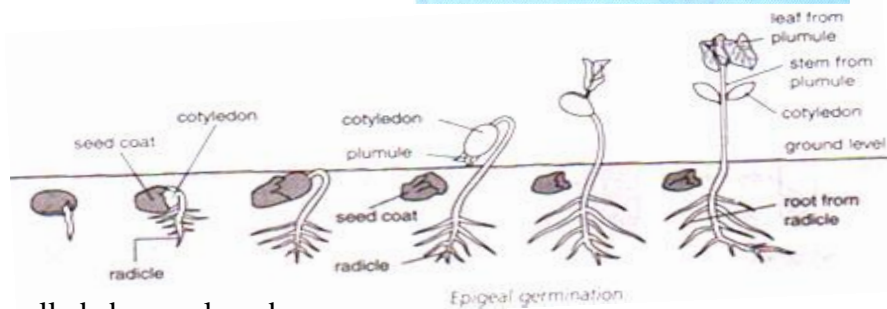
96. PLANT

- a. Anther + filament = **stamen** = male reproductive – luar sekeliling pistil
- b. Style + ovary + stigma + ovule = **pistil** = female reproductive – dalam
- c. Ovule (in) --> seed, Ovary (out) ---> fruit
- d. Pollination – the transfer of pollen grain from an anther to a stigma
- e. Advantage cross pollination
 - i. Short ripening period
 - ii. More resistant against disease
 - iii. Quantity increase
 - iv. More variety



97. GROWTH PLANT

- a. **R**adical – **R**oot
 - b. **P**lumule – **P**ucuk /shoot
98. Type of germination
- a. Epigeal germination - cotyledon is pulled above – long bean
 - b. Hypogeal germination - cotyledon is pulled underground – maize



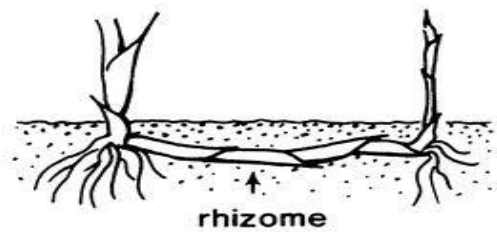
99. Condition needed GERMINATION

- a. Water
- b. Suitable temperature
- c. Air (oxygen) CAHAYA MATAHARI TIDAK DIPERLUKAN



100. ORGAN VEGETATIVE

- d. Leaf - setawar
- e. Root - tuber (sweet potato, carrot)
- f. Stem (ingat...ada soalan objektif tanya?)
 - v. Bulb - onion
 - vi. Corm - yam
 - vii. Rhizome (dlm tanah) - ginger
 - viii. Runner (luar tanah) - strawberry
 - ix. Sucker - banana
 - x. tuber - sweet potato



101. FRACTIONAL DISTILLATION (chapter 6 form 3)

Petroleum fraction	Uses	Clue
Petroleum gas	Fuel to make plastic and cooking gas	Girl
Petrol (gasoline)	Fuel for motor vehicles and machine	Pondan
Naphtha	Fuel making plastic and PVC	Nak
Kerosene	Fuel for jet aircraft and rocket	Kahwin
Diesel oil	Fuel for diesel engine	Dengan
Lubricating oil	Fuel for engine and machine	Lelaki
Fuel oil	Fuel for ship and electric generators	Fantasi
Wax	Fuel to make polish, candle	
Bitumen	Fuel to seal road surface	Beb

102. STEP IN INVESTIGATION:

Identified the problem	Ingat
Making hypothesis	Mu
Planning an experiment	Pelakon
Control variable	Comel
Collect data	Can Tik
Analyzing and interpret data	Aku
Making conclusion	Minat
Write a report	Weh

Nota: dulu carry, control

103. Living thing (ANIMAL & PLANT) uses O₂ and give out CO₂ during respiration

104. Hypothesis/Relationship/Conclusion –

- a. The the MV, the the RV
- b. As MV increase, RV increase
- c. When MV increase, RV increase
- d. If MV increase, RV decrease
 - i. INGAT JIKA RV ...dulu...diikuti. MV..... SALAH
 - 1. Contoh: jika masa meningkat, suhu meningkat betul
 - 2. Contoh: jika suhu meningkat masa meningkat salah PMR 07

105. Inference - Responding Variable because Manipulated Variable

a. Lihat pada graf – paksi menegak **RV**, paksi mendatar **MV**

106. Define operationally - ‘mesti tulis soalan semula’ + **RV** + bacaan
seperti mana yang ditunjukkan oleh gambarajah

Contoh PMR 09: ‘Combustion’ ialah masa lilin untuk padam seperti yang ditunjukkan oleh bacaan

Contoh PMR 08: ‘the rate of transpiration’ is the position/reading of the air bubble. *Tiada alat ditunjukkan*

Contoh: trial PMR 2010 ‘tekanan udara’ ialah bacaan tolok tekanan

‘air pressure’ is shown by the reading of pressure gauge

Fikirkan sejenak: ‘Define operationally’ + **RV** + alat apa

Jika: ‘ulang soalan’ is seperti ulang soalan (maka perlu ambil pada alat yang mengukur)

Cth: current is a current. ---- salah

Jawapan: current is a reading of ammeter.

107. GRAF

- a. garis mesti satu sahaja. Tidak boleh sambung-menyambung
- b. kalau data diberi/ada nilai ‘0’, maka graf **MESTI MULA** dgn nilai ‘0’
- c. Jika data tidak diberi/tiada nilai ‘0’, maka graf **jangan** mula dgn nilai ‘0’

d. Biasanya :

- i. paksi menegak/y - **responding variable**
- ii. paksi mendatar/x - **manipulated variable**
- iii. kalau jadual

Manipulated Variable	2	4	6
Responding Variable			

a. Graf – graf garis/line

b. Graph bar – graf bar

c. Graph line – graf line

108. EQUATION

a. Respiration

i. Glucose + oxygen → **water** + CO₂ + energy (haba)

b. Burning

i. Fuel + oxygen → fuel burns + heat + light

c. Fuel

- i. **Carbon** + oxygen → CO₂ + heat + light ex: **coal**
- ii. **Hydrocarbon** + oxygen → CO₂ + **water** + heat + light ex: **candle, petrol**
- iii. **Alcohol** + oxygen → CO₂ + **water** + heat + light ex: **ethanol**
- iv. Charcoal + oxygen → CO₂ + heat + light - **Ingat – charcoal - arang**
- v. Coal + oxygen → CO₂ + **water** + heat + light - **Ingat – coal – arangbatu (hydrocarbon)**
- vi. **Food (roti @ biskut) + oxygen** → CO₂ + **water** + heat + light
- vii. Kerosene + oxygen → CO₂ + **water** + heat + light

INGAT: Semua daripada HYDROCARBON akan mengeluarkan **WATER**

Petroleum fraction (HYDROCARBON)
Petroleum gas
Petrol (gasoline)
Naphtha
Kerosene

Diesel oil
Lubricating oil
Fuel oil
Wax/LILIN
Bitumen

a. Calcium carbonate + hydrochloric acid -----> calcium chloride + water + CO₂

b. Photosynthesis – water + energy + CO₂ -----(light + chlorophyll)-> food + Oxy

c. Burning food

Sugar + oxygen ---burnt-> water + Co₂ + heat energy

d. Neutralization

109. Common characteristics (sangat banyak)

a. WAY/type of Reproduction

i. sexual reproduction

ii. asexual reproduction

b. type of asexual

i. binary fission - bacteria, amoeba, algae, paramecium

ii. budding - hydra, yeast

iii. spore formation - mould, moss, fungus

iv. vegetative - bryophyllum, onion, tapioca

v. rejuvenation - starfish, planarian, flatworm

c. Type of vegetative reproduction

i. Rhizome - ginger, lalang

ii. Tuber - potato

iii. Runner - grass, strawberry

iv. Corm - yam

v. Leaf - bryophyllum

vi. Stem - tapioca, sugarCane

vii. Bulb - onion

viii. Sucker - banana, bamboo

d. type of fertilization

i. internal fertilization ii. external fertilization

a. long filament

b. big anther

c. small petal

d. featherly stigma

e. stigma and anther are hung outside the flower/petal

f. support system in plant

i. water turgidity (turgor pressure– balsam plant)

ii. woody tissue

iii. buoyancy of water

iv. air sacs – water hyacinth, lotus

v. buttress root – durian, casuarinas (pokok ru) ingat.. resin – pokok pine ... sama spt pokok ru

vi. stilt root - mangrove

vii. thorn - bouganvila (pokok bunga kertas)

viii. tendrils - cucumber, pumpkin

ix. prop root - maize

x. clasping root - orchid, pepper,

- xi. twining - morning glory, long bean, bitter gourd
 - g. type of skeleton – endoskeleton, exoskeleton, hydrostatic skeleton
 - h. flowering & non-flowering
110. Work done (nilai energy sama dengan nilai work done) cth 100 joule WD = 100 Joule Energy
 1 kg = 10 N
- i. Mass + load x height - naik tangga
 - ii. Mass + load x distance - dirinya & bawa barang ke depan
 - iii. force x distance - punggung barang
- Power (watt) = work done (Joule) / time taken (s)

111. Moment of force (Nm) = perpendicular distance from the fulcrum to the force (m) X force (N)

112. Parallel → V sama (I tambah, R bahagi) V = I X R Ohm's Law

113. JIKA SIRI – SELARI, BERGANTUNG KEPADA SOALAN NAK SELESAI MANA DULU. lihat soalan

114. To increase the moment of force (Moment either clockwise or anticlockwise)
1. Increase the perpendicular distance
 2. Increase the magnitude of applied force

115. P.V.I. - {Power (watt)=Voltage (V) x Current (A)}, tukarkan utk I = P/V bagi electrical appliance

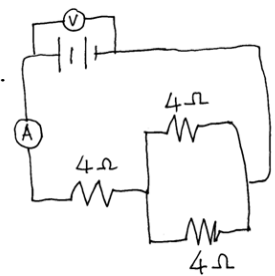
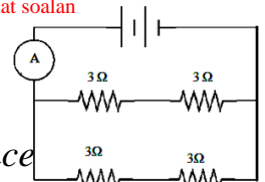
116. Untuk kira kos elektrik – POWER bahagi dengan 1000 (utk dapatkan KWh)

Cth: Power 1000w, 240V

$$\frac{1000w}{240V}$$

$$\frac{1000}{240}$$

dapat 1KW.... Tanya cikgu... nak cerita susah...



What is the total resistance in the circuit?
 Apakah nilai keseluruhan rintangan di dalam litar?

Kalau soalan bagi minit, maka kena tukar kepada jam.

Contoh: 30 minit

$$\frac{30}{60} = 0.5 \text{ jam}$$

117. Electrical Energy (kWh) = power (kW) x time (h) utk kira bil elektrik x harga perunit

118. Kos electrical = kWh x cost

119. Wayar elektrik Ingat wayar HIDUP ditepi Fius dan atas sekali wayar BUMI

120. Wayar HIDUP – current flow, wayar NEUTRAL – bawa balik current

121. Jika 2.5A current, maka fuis mesti lebih besar Nilai dari current flow cth 3.0A

122. Fuse – function – prevents the appliances or the live wire from burning

123. Fuse – melts – breaks the circuit

i. FUNCTION

iv. prevent excessive current

v. Protect an electric circuit against excessive current

123. chlorine - iodine – solid, Bromine – liquid

124. Air – compound, air laut – mixture

125. charcoal – arang kayu, coal – arang batu

SELAMAT BERJAYA DALAM PMR usaha, doa, tawakkal ...