

Skema Jawapan Biology Kertas 1, 2, 3

Percubaan SPM 2011 Negeri Perak Darul Ridzuan

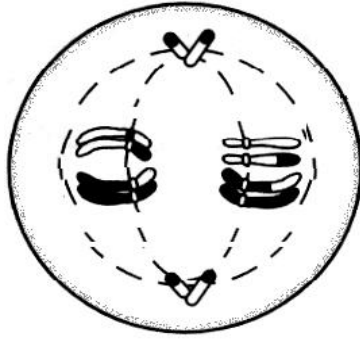
ANSWER FOR BIOLOGY PERCUBAAN SPM PAPER 1 – TAHUN 2011

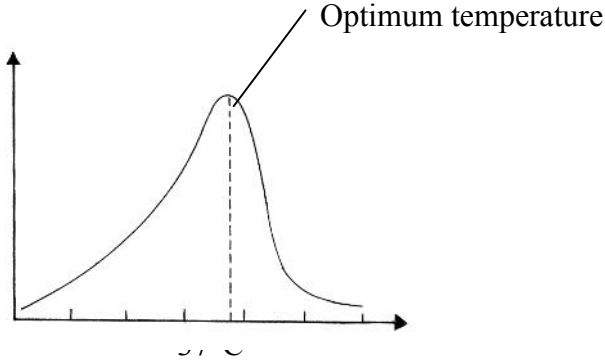
1	D	21	A	41	B
2	C	22	D	42	D
3	B	23	A	43	D
4	C	24	A	44	B
5	C	25	B	45	C
6	B	26	A	46	D
7	D	27	B	47	B
8	D	28	A	48	C
9	D	29	A	49	D
10	C	30	D	50	C
11	A	31	A		
12	A	32	D		
13	C	33	D		
14	C	34	A		
15	A	35	C		
16	D	36	D		
17	A	37	D		
18	B	38	B		
19	C	39	B		
20	B	40	A		

SKEMA JAWAPAN BAGI PEPERIKSAAN PERCUBAAN SPM 2011

MATA PELAJARAN : BIOLOGI
KERTAS : 2 (4551/2)

SECTION A :

No,	Suggested answer	Mark
1(a)(i)	Plasma membrane	1 1
(a)(ii)	Semi permeable	1
(a)(iii)	Allow certain substances to pass through freely while others cannot.	1
(b)(i)	Level 2 - Tissue Level 3 - Organ	1 1
(b)(ii)	Differentiation	1 1
(c)(i)	Secretes enzyme / juice / hydrochloric acid / secretes mucous/ absorption of digested food.	1
(c)(ii)	1. Amino acid 2. Glucose	1 1
(c)(iii)	Hepatic portal vein	
(c)(iv)	- excess glucose is converted to glycogen and store in the liver / muscle - excess amino acid undergo deamination to form urea / nitrogenous waste products to be removed through the kidneys	1 1
2(a)	P – Interphase S – Telophase I	1 1
(b)	 <p>L – location of homologous chromosome (at equatorial plate) P – correct pairing</p>	1 1
(c)	P1 - Homologous chromosomes separate	1

	P2 - move to opposite poles	1
(d)(i)	Fertilisation	1
(d)(ii)	Down's syndrome	1
(d)(iii)	Chromosome number 21	1
(d)(iv)	P1 - Chromosomes number 21 fails to separate during anaphase I // non-disjunction of chromosome number 21 during anaphase I P2 - when fertilisation occurs, 24 chromosomes in the ovum will fused with 23 chromosomes in the sperm P3 - produce zygote with 47 chromosomes// trisomy 21	1 1 1 Jumlah =12
3(a)	M- Hydrolysis X - lipase	1 1
(b)(i)		1 - drawing 1 - label
(b)(ii)	37°C	1
c(i)	Y - fatty acid.	1
(c)(ii)	P1 - Fat deposit at the inner wall of arteries // caused arterosclerosis// P2 - the individual will suffered cardiovascular diseases// high blood pressure // stroke// heart attack P3 - if the blood clot in the blood vessel, the individual will suffered coronary thrombosis	1 1 1
(d)	P1 - active site of enzyme X is not complement to the shape of maltose P2 - Maltose cannot bind to enzyme X P3 - no enzyme substrate complex is formed P4 - maltose is not hydrolysed/ broken down	1 1 1 1 Jumlah = 12

4(a)(i)	P - Leucocyte / white blood cells/ phagocytes / monocyte / neutrophyll Q - Lymphocytes	1 1
4(a)(ii)	- white blood cell / phagocytes engulf the pathogen - by phagocytosis - hydrolytic enzyme/ lysozyme digest/ breakdown the pathogen, (product are absorbed)	1 1 1 Any 2
4(b)(i)	Antibody	1
4(b)(ii)	Specific	1
4(c)(i)	Individual X : Artificial / (Acquired) active immunity Individual Y : Artificial / (Acquired) passive immunity	1 1
4(c)(ii)	X – Vaccine Y – Antiserum	1
4(c)(iii)	- In X, after second injection, the concentration of antibody increase slowly and become higher than immunity level and is maintain for a long time. - In Y, after the second injection , the concentration of antibody reduces slowly to below the immunity level.	1 1
5(a)(i)	X : Meiosis Y : Pollen grains	1 1
5(a)(ii)	- have 2 nuclei i.e tube nucleus and generative nucleus - haploid - have very rough surface	1 1 1
5(b)(i)	Pollination	1
5(b)(ii)	- pollinating agent (wind / water/ animal) - transfer the pollen onto the stigma - Pollen grain will stick onto the surface of the stigma	1 1 1 Any 2
5(c)(i)	- one male gamete will fuse with the egg cell to form a diploid zygote - another male gamete will fuse with 2 polar nuclei to form triploid nucleus - both process take place at the same time // double fertilisation occurs	1 1 1
5(c)(ii)	- diploid zygote will developed to form an embryo - triploid nucleus will developed to form the endosperm tissue - endosperm tissue nourishes the developing embryo	1 1 1 Any 2 Jumlah = 12

SECTION B :

No,	Suggested answer	Mark
6a	- Saliva is secreted by the salivary glands in the mouth	1
	- salivary gland secretes amylase / Saliva contain amylase	1
	- amylase will hydrolyse starch into maltose	1
	- remaining starch and maltose enters the stomach	1
	- (stomach do not contain carbohydrase), so no digestion of carbohydrate will take place in stomach	1
	- Duodenum received pancreatic amylase from pancreas	1
	- pancreatic amylase will hydrolyse the remaining starch into maltose	1
	- the wall of illeum secretes maltase	1
	- maltase will hydrolyse maltose into glucose	1
		Max 6
6b	- glucose in the lumen of small intestine enter the epithelial cells by active transport	1
	- glucose from epithelial cells enter blood capillary by facillitated diffusion	1
	- blood carry the glucose into the hepatic portal vein	1
	- hepatic portal vein channel the blood containing glucose into the liver	1
	- liver cells will use/ assimilate some of the glucose	1
	- blood then send the glucose to the heart via hepatic vein and then vena cava	1
	- heart pump the blood to all body cells	1
	- glucose diffused from the blood capillary into the body cells by facillitated diffusion.	1
		Max 6
6c	- process is called aerobic respiration	1
	- glucose diffuse into cells P from blood capillary	1
	- oxygen also diffuse into cells P from the blood capillary	1
	- cells P contain a lot of mitochondria	1
	- mitochondria (contain enzymes) for cell respiration// mitochondria carry out cell respiration	1
	- oxidation of glucose (take placed in mitochondria)	1
	- in a series of reactions catalysed by respiratory enzymes in mitochondria	1
	- 1 molecules of glucose will produce 38 molecules ATP / more ATP are produced	1
	- water and carbon dioxide are released as waste material in this process	1
		Max 8
7a	- tendons connect the muscles to the bones	1
	- tendons are strong and non-elastic	1
	- tendons transfer the force from the muscles to the bones	1
	- ligaments connect two bones together at the joint to give support and strength	1
	- ligaments make the movement at the joint possible	1

	<ul style="list-style-type: none"> - ligaments are strong and elastic - the muscles work in pairs but in opposite manner / antagonistic - quadriceps femoris / extensor muscle contracts while biceps femoris / flexor muscle relaxes, leg is straightened - quadriceps femoris / extensor muscle relaxes and biceps femoris/ flexor muscle contracts, the leg is bent - calf muscles contracts to lifted up the heels - Feet is pushed downward and backward, - produced force on the ground - the boy is pushed forward - contraction and relaxation of the muscles are repeated, so the boy can run or walk 	1 1 1 1 1 1 1 1 1 Any 10
7b	<ul style="list-style-type: none"> - Light enters the retina and the image of the fierce dog is formed - nerve impulses is generated by the sensory nerves at the retina - the nerves impulses are transmitted to the brain/ central nervous system to be analysed/ interpreted** - sound waves enter the cochlea in the ears - the nerve impulses are generated and transmitted to the brain / central nervous system to be analysed/ interpreted** - the hypothalamus is activated to send nerve impulses directly to the adrenal medulla - adrenal medulla secretes adrenaline into the blood stream - adrenaline will increase the metabolic rate - it stimulates the heart to beat faster - and also increase the breathing rate - and increase the conversion of glycogen to glucose - finally send <u>more</u> oxygen and glucose to the brain and skeletal muscles - the brain is highly alert to mobilise the various parts of the body for immediate action - the skeletal muscles become energised to flee immediately from danger/ to run away from danger / to climb a big tree. - this reaction is called the fight-or-flight action - these changes will prepares the boy to respond to the dangerous situation/ threatening situation <p>** only give mark once</p>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 Any 10
8a	<ul style="list-style-type: none"> - Edmond produced haploid gametes / sperms by meiosis - sperms have different genetic compsiton / show variation - because crossing over takes place at prophase 1 meiosis - the genetic content is exchanged between the homologous chromosomes. - Sophie's ovary produced 2 ova at that moment of time - both ova have different genetic content - when the two different sperms fertilise the two different ova - two different zygotes will be produced - these two different zygote will undergo mitosis repeatedly to develop into embryo 	1 1 1 1 1 1 1 1 1

	<ul style="list-style-type: none"> - the two embryo will develop into the foetus with different/ same gender (In this case, they have the same gender) - each of them may have different genotype/ genetic content - each of them also may have different phenotype - for example the blood group, the skin colour, and the type of hair (curly/ straight) may differ - fraternal / non-identical twin 	1 1 1 1 1 1 Any 10
8b	<ul style="list-style-type: none"> - mutagens are substances/ factors which cause mutation - examples of mutagens are radiations (gamma rays/ ultra violet ray/ x-rays) from radioactive substances or chemicals such as preservatives, benzene, formaldehyde, asbestos, carbon tetrachloride, mustard gas or tar in tobacco - mutation will cause a permanent change to the gene or chromosomes / structures - carcinogenic substances can cause cancer - so mitosis will take place (repeatedly) out of control // uncontrol mitosis - the new cells will be reproduced very fast - the cells become malfunction - chromosomal mutation also will cause improper segregation/ non-disjunction) of homologous chromosomes during meiosis - so the gametes produced may have one extra chromosome or less one chromosome / abnormal number of chromosomes - this situation will cause the formation of abnormal gametes. - an abnormal gamete is fertilised with a normal gamete, an abnormal zygote will be produced - the abnormal zygote will develop into a baby, the baby will have genetic disorder - for example down syndrome baby have 47 chromosomes, an extra chromosome at the chromosome number 21. - a Klinefelter's syndrome baby has 45 chromosomes - during meiosis, the chromosome structure can also be changed by deletion, inversion, duplication or translocation through mutation - gene mutation can occur by substitution, insertion or deletion - (these situations) will cause genetic disorder such as sickle-cell anaemia, haemophilia, albinism. - these genetic disorder will be inherited and can cause early death 	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 Any 10
9a	<p>Farm A :-</p> <ul style="list-style-type: none"> - the production is high - the maize produce big corn - the maize get enough water, nutrient and light - because there is no competition between the maize and the weeds - so the rate of photosynthesis is very high 	1 1 1 1 1

	<p>Farm B :-</p> <ul style="list-style-type: none"> - the production is low - the maize will produce smaller corn - the maize do not get enough water, nutrient and light - because interspecific competition occurs between the maize and the weeds - both compete for the same space, nutrient, light and water - so the rate of photosynthesis will be lower - the rate of growth of the maize is also lower. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any 10</p>
9b	<ul style="list-style-type: none"> - fungicides, herbicides or pesticides are chemical substances used to control the organisms which destroy the crops - These substances not only kill the fungi, weeds and insects / control the population of the organisms which destroy the crops but also harmless organisms - the organisms will be extinct / become infertile - the effect is very fast / immediate - this method is known as chemical control - the effects of herbicides, fungicides or pesticides can be persistent and will remain in the environment for long periods - it will enter the food chain through water/ soil - the concentration of toxic substances accumulated will increase as the trophic level increases / may accumulate in the tissues of final consumers - it will be toxic to human health - some chemical substances are mutagens - can cause mutations in humans - the pests/ fungi/ weeds will become immune to chemical substances / develop resistance - so we cannot control the population anymore / a larger amount of pesticides may now be required to produce a similar effect - the cost of using fungicides, pesticides or herbicides is high - extensive uses of pesticides pollutes the environment 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>Any 10</p>

SKEMA JAWAPAN.**BIOLOGI KERTAS 3 (4551/3)****SOALAN 1**

1 (a) [KB0603 – Measuring Using Number]

Score	Criteria								
3	<p>Able to measure and record the time taken for methylene blue solution to decolourise (minutes) in Table 1 correctly:</p> <p>Sample answers</p> <table border="1"> <tr> <td>Water sample</td><td>Time taken for the methylene blue solution to decolourise (minutes) <i>Masa yang diambil untuk larutan metilena biru meluntur (minit)</i></td></tr> <tr> <td>Drain water <i>Air longkang</i></td><td>22</td></tr> <tr> <td>River water <i>Air sungai</i></td><td>37</td></tr> <tr> <td>Pond water <i>Air kolam</i></td><td>58</td></tr> </table>	Water sample	Time taken for the methylene blue solution to decolourise (minutes) <i>Masa yang diambil untuk larutan metilena biru meluntur (minit)</i>	Drain water <i>Air longkang</i>	22	River water <i>Air sungai</i>	37	Pond water <i>Air kolam</i>	58
Water sample	Time taken for the methylene blue solution to decolourise (minutes) <i>Masa yang diambil untuk larutan metilena biru meluntur (minit)</i>								
Drain water <i>Air longkang</i>	22								
River water <i>Air sungai</i>	37								
Pond water <i>Air kolam</i>	58								
2	Able to measure and record 2 Time taken for the methylene blue solution to decolourise (minutes) correctly								
1	Able to count and record 1 Time taken for the methylene blue solution to decolourise (minutes) correctly								
0	No response or wrong response.								

1 (b) (i) [KB0601 - Observation]

Score	Criteria
3	<p>Able to state any two observations correctly according to 2 criteria:</p> <ul style="list-style-type: none"> Water sample (Manipulated Variable) Time taken for the methylene blue solution to decolourise (minutes) (Responding Variable) <p>Sample answers:</p> <ol style="list-style-type: none"> If drain water used, the time taken for methylene blue to decolourise is 22 minutes If river water used, the time taken for methylene blue to decolourise is 37 minutes If pond water used, the time taken for methylene blue to decolourise is 58 minutes If drain water used, the time taken for methylene blue to decolourise is 22 minutes compare to others If river water used, the time taken for methylene blue to decolourise is 37 minutes compare to others If pond water used, the time taken for methylene blue to decolourise is 58 minutes compare to others <p>*1,2 & 3 is a horizontal observation</p>

	*4, 5 & 6 is a vertical observation
2	<p>Able to state any one observation correctly. <i>or</i> Able to state any two incomplete observations (any 2 criteria)</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. If drain water used, the time taken for methylene blue to decolourise is shortess 2. If pond water used, the time taken for methylene blue to decolourise is is longest 3. If drain water used, the time taken for methylene blue to decolourise is faster compare to others 4. If pond water used, the time taken for methylene blue to decolourise is is the longest compare to others
1	<p>Able to state any one idea of observation.(any 1 criteria)</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. The time taken for methylene blue to decolourise is different when use different water sample 2. When used drain water, the time taken for methylene blue to decolourises is shortest 3. When used pond water, the time taken for methylene blue to decolourises is longest
0	Not able to response <i>or</i> wrong response.

1 (b) (ii) [**KB0604 - Making inferences**]

Score	Criteria
3	<p>Able to make one logical inference for each observation based on the criteria</p> <ul style="list-style-type: none"> • Oxygen content • Level of pollution <p>Sample answers:</p> <ol style="list-style-type: none"> 1. Because drain water contain less oxygen so it is the most polluted 2. Because river water contain less oxygen so it is polluted 3. Because pond water contain more oxygen so it is less polluted. 4. Because drain water contain less oxygen so it is the most polluted compare to other water samples. 5. Because river water contain less oxygen so it is polluted compare to pond water 6. Because the pond water contain more oxygen so it is the less polluted compare to others <p>*1,2 &3 is a horizontal inference *4, 5 & 6 is a vertical inference</p>
2	<p>Able to make one logical inference for any one observation. <i>or</i> Able to make one logical and incomplete inference base on one criterion for each observation.</p> <p>Sample answer:</p>

	1. Different water sample have different level of pollution 2. Different water sample contain different amount of dissolved oxygen, so the level of pollution s different. 3. More oxygen in the water sample, the less polluted it is. 4. Less oxygen in the water sample, the more polluted it is. 5. Level of water pollution depend on the dissolved oxygen in it.
1	Able to make an idea of inference with one criterion. Sample answers <ol style="list-style-type: none"> 1. Drain water is polluted 2. Pond water is polluted less. 3. All water are polluted. Or any other suitable answer
0	Not able to response <i>or</i> wrong response.

1(c) [KB061001 – **Controlling Variables**]

Variables	How the variables are operated
Manipulated: Water sample	Use water sample from different sources // used three different water sample i.e drain water, river water sand pond water // change the water sample used i.e drain water, river water sand pond water
Responding: Time taken for the methylene blue to decolourise (minutes)	Measure and record Time taken for the methylene blue to decolourise when exposed to 100 ml of different water sample by using stop watch
Fixed: Volume of water sample / volume of methylene blue solution (ml)	Maintain the volume of water sample at 100 ml / use fix volume of methylene blue solution

1(d) KB0611- **Making Hypothesis**]

Score	Criteria
3	Able to state a hypothesis to show a relationship between the manipulated variable and responding variable and the hypothesis can be validated, based on 3 criteria: <ul style="list-style-type: none"> • manipulated variable • responding variable • relationship Sample answer : <ol style="list-style-type: none"> 1. The longer the time taken for methylene blue to decolorise, the less polluted the water sample. 2. The shorter the time taken for methylene blue to decolorise, the more polluted the water sample

2	<p>Able to state less accurate hypothesis to show a relationship between manipulated variable and responding variable base on 2 criteria.</p> <p>Sample answer</p> <ol style="list-style-type: none"> 1. Different time taken for methylene blue to decolorise, the different the level of water polluted. 2. Level of water pollution depend on the time taken for methylene blue to decolorise.
1	<p>Able to state idea of hypothesis to show a relationship between manipulated variable and responding variable base on 1 criterion.</p> <p>Sample answer</p> <ol style="list-style-type: none"> 1. The time taken for methylene blue solution to decolorise is varied. 2. Different water sample have different level of pollution.
0	Not able to response <i>or</i> wrong response.

1(e) (i) [KB0606 – Communicating]

Score	Criteria												
3	<p>Able to draw and fill a table with all columns and rows labeled with complete unit</p> <p>Sample answers</p> <table><tr><th>Water sample</th><th>Time taken for methylene blue blue solution to decolorise (minutes)</th><th>Level of water pollution</th></tr><tr><td>Drain water</td><td>22</td><td>1</td></tr><tr><td>River water</td><td>37</td><td>2</td></tr><tr><td>Pond water</td><td>58</td><td>3</td></tr></table>	Water sample	Time taken for methylene blue blue solution to decolorise (minutes)	Level of water pollution	Drain water	22	1	River water	37	2	Pond water	58	3
Water sample	Time taken for methylene blue blue solution to decolorise (minutes)	Level of water pollution											
Drain water	22	1											
River water	37	2											
Pond water	58	3											
2	Able to draw a table with incomplete data												
1	Able to draw a table without data												
0	Not able to response <i>or</i> wrong response.												

1(e) (ii) KB0607 – Space and time relationship

Score	Criteria
3	<p>Able to draw a bar chart with 3 criteria:</p> <ul style="list-style-type: none"> • A(axis): correct title with unit and uniform scale • P (point) : transferred correctly • S (Shape): able to joint all points, smooth graph, bell shape.
2	Able to plot a graph with any 2 criteria

1	Able to plot a graph with any 1 criteria
0	Not able to response <i>or</i> wrong response.

g (iii) [KB0608 – Interpreting Data]

Score	Criteria
3	<p>Able to state clearly and accurately the relationship between the time taken for the methylene blue solution to decolorise and the level of water pollution. criteria:</p> <ul style="list-style-type: none"> • P1- between the time taken for the methylene blue solution to decolorise • P2- the level of water pollution <p>Sample answer: <i>(Associates each of the condition with the level of water pollution)</i></p> <ol style="list-style-type: none"> 1. The drain water is the most polluted because the time taken for the methylene blue solution to decolorise is the shortest. 2. The pond water is the less polluted because the time taken for the methylene blue solution to decolorise is the longest. 3. River water is polluted because the time taken for the methylene blue solution to decolourise is the longer
2	<p>Able to state clearly but less accurate the relationship between the time taken for the methylene blue solution to decolorise with the level of water pollution</p> <p>Sample answer:</p> <ol style="list-style-type: none"> 1. Drain water is most polluted because the time for methylene blue solution become colorless the shortest. 2. Pond water is less polluted because the time for the methylene blue solution become colorless is the longest 3. River water is polluted because the time for methylene blue become colourless is longer
1	<p>Able to state the idea of the relationship .</p> <ol style="list-style-type: none"> 1. Different water sample have different time taken to decolorise the methylene blue solution 2. Different water sample have different level of pollution. 3. Water sample affect the time taken for methylene blue solution to decolorise.
0	Not able to response <i>or</i> wrong response.

(g) [KB0605 – Predicting]

Score	Criteria
3	<p>Able to predict the result accurately base on 2 criteria.</p> <ul style="list-style-type: none"> • Expected time taken for the methylene blue solution decolorise • The reason of the answer

	<ul style="list-style-type: none"> Level of water pollution <p>Sample answer: P1- Time taken for the methylene blue solution decolorise become shorter than 22 minutes P2- Because more oxygen from atmosphere was dissolved in the solution P3- Drain water become less polluted</p>
2	<p>Able to predict the result less accurate base on 1 criteria</p> <p>Sample answer:</p> <p>The time taken for the methylene blue solution decolorise become shorter because the more oxygen found in the water sample</p>
1	<p>Able to give idea of the result</p> <p>Time taken for the methylene blue solution decolorise become shorter</p>
0	Not able to response <i>or</i> wrong response.

(h) [KB0609] [**Define operationally**]

Score	Criteria
3	<p>Able to explain the level of water pollution operationally base on 3 criteria:</p> <ul style="list-style-type: none"> Time taken for methylene blue solution to decolorise The level of water pollution The water sample <p>Sample answer The level of water pollution is the time taken for methylene blue to decolorise, the shortest the time taken the higher the level of water pollution.</p>
2	<p>Able to state the abiotic factor base on 2 criteria.</p> <p>Sample answer:</p> <p>The level of water pollution is the time taken for methylene blue to decolorise</p>
1	<p>Able to state the idea of the level of water pollution</p> <p>The time taken for methylene blue to docolorise shows the level of water pollution</p>
0	Not able to response <i>or</i> wrong response.

(h) [KB0602 – Classifying]

Score	Criteria										
3	Able to classify all 5 listed objects into apparatus and material <table border="1"> <thead> <tr> <th>Apparatus</th><th>Material</th></tr> </thead> <tbody> <tr> <td>Stop watch</td><td>Water sample</td></tr> <tr> <td>Syringe</td><td>0.1% Methylene blue solution</td></tr> <tr> <td>Measuring cylinder</td><td></td></tr> <tr> <td></td><td></td></tr> </tbody> </table>	Apparatus	Material	Stop watch	Water sample	Syringe	0.1% Methylene blue solution	Measuring cylinder			
Apparatus	Material										
Stop watch	Water sample										
Syringe	0.1% Methylene blue solution										
Measuring cylinder											
2	Able to classify 2 apparatus and 2 materials										
1	Able to classify 1 apparatus and 1 material										
0	Not able to response <i>or</i> wrong response.										

SOALAN 2

Aspect	Criteria	Score
KB1201 Identifying Problem Statement	Able to write problem statement correctly base on 3 criteria: <ul style="list-style-type: none"> Manipulated variables –(Food samples) Responding variable – (Energy content) Relationship Sample answer: <ol style="list-style-type: none"> How does the difference food sample affect the energy content? Does the difference food sample affect the energy content? Does the dried coconut flake contain the highest energy value? 	3
	Able to write a problem statement base on 2 criteria only Sample answer: <ol style="list-style-type: none"> Difference food sample affect the energy value (not in question form) 	2

	2. Which food sample contain the highest energy value?	
	Able to write a problem statement base on 1 criterion only/idea Sample answer: 1. Is the food sample affect the energy value? (Jawapan hanya ya/tidak) 2. To investigate the energy value in food sample (Tiada P1)	1
	Wrong or no response	

KB061202 Making Hypothesis	Able to write a suitable hypothesis correctly base on the 3 criteria: <ul style="list-style-type: none"> • Manipulated variable • Responding variable • Relationship Sample answer: 1. The higher the increase of temperature of 20 ml water, the higher the energy content in the food sample when the food sample burnt completely. 2. If the increase in temperature of 20 ml of water higher, the energy content of the food sample is higher when the food sample burnt completely. 3. As the temperature of 20 ml of water increase higher, the energy content in the food sample is higher when the food sample burnt completely. (wrong hypothesis (vise versa) is accepted)	3
	Able to write correct hypothesis but consist of 2 criteria only Sample answer: Different food sample contain different energy value.	2
	Able to give an idea about the problem statement.	

	Sample answer: Difference food sample effect the energy value.	1
	Wrong or no response	0

Aspect	Criteria	Score
KB061201 Variables	Able to identify all the three variables correctly. Sample answer: Manipulated variable : The type of food sample Responding variable: The increase in temperature of 20 ml of water when the food sample burnt completely (°C) Controlled variable: Volume of water (20 ml)	3
	Able to write any two of the variables correctly	2
	Able to write one of the variable correctly	1
	Wrong or no response	

Aspect	Criteria	Score
KB061205 Materials and Apparatus	Able to list all materials and apparatus needed to carry out the experiment successfully. Sample answer: Materials(M) : food sample, distilled water, plastecine. Apparatus (A): Retort stand, thermometer, neddle, boiling tube, matches, electronic balance 3M + 6A	3
	2M + 4A	2
	1M + 1-2 A	1
	If no M	0

Aspect	Criteria	Score
KB061204 Procedure	Able to write all the steps in carrying out the experiment successfully. K1: Steps to set up the apparatus K2: Steps to handle the fixed variable K3: Steps to handle the manipulated variable K4: Steps to handle the responding variable K5: Precautionary steps/steps to get accurate results / readings.	
	3 K1 + 1K2+1K3 +1K4 +1K5	3
	Any 3-4 K	2
	Any 2 K	1
	1K or wrong response	0

Procedure			Score
K1	1	The students able to shows the set up of the apparatus clearly	
K5	2	The students able to use the wind shield to avoid the heat loss	
K3/K1	3	Measure the mass of the food samples and pin up with the needle and food the needle onto the plastecine.	
K1/K2	4	Measure 20 ml of distilled water pour into boiling tube	
K5	5	Able to state the precautionary action / steps to get the accurate result	
K4	6	The increase in temperature was measured when each food sample burnt completely	
K4	7	Repeat step 4 and 5 .	
K2/K4	8	The increase in temperature caused by all food sample when it was burnt completely was recorded	
K3/K4	9	Calculate the amount of energy value in each food sample by using a formula	

Aspect	Criteria	Score																				
KB061204 Communicating data	<p>Able to draw a complete table to record the relevant data base on the 3criteria:</p> <ul style="list-style-type: none">• Type of food sample• Increase in temperature of 20 ml of distilled water when the food sample burnt completely• The units in ml or cm³ <p>Sample answer:</p> <table><tr><th>Type of food sample</th><th colspan="2">Temperature of 20 ml of distilled water (°C)</th><th>Increase in temperature</th></tr><tr><td></td><th>Initial</th><th>Final</th><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table>	Type of food sample	Temperature of 20 ml of distilled water (°C)		Increase in temperature		Initial	Final														2
Type of food sample	Temperature of 20 ml of distilled water (°C)		Increase in temperature																			
	Initial	Final																				
	<p>Able to draw a complete table to record the relevant data without total volume produced/ one of the title have no unit</p>	1																				
	<p>Wrong answer or both titles have no units.</p>	0																				

Conclusion

The energy content in each food sample is different, the higher the increase in temperature of 20 ml of water when food sample burnt completely , the higher the energy value of the food sample

Planning Experiment :

7-9 ticks = 3 m

4 -6 ticks = 2 m

1-3 ticks = 1 m