

SKEMA PENILAIAN PERCUBAAN SPM NEGERI PAHANG
TAHUN 2017

Question 1

No	Mark Scheme	Score										
KB0603 – Measuring Using Number												
1(a)	<p>Able to record all 4 readings for the number of students with different patterns of thumbprint</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Pattern of thumbprint</th> <th style="text-align: center;">No of students</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Whorl</td> <td style="text-align: center;">6</td> </tr> <tr> <td style="text-align: center;">Loop</td> <td style="text-align: center;">8</td> </tr> <tr> <td style="text-align: center;">Composite</td> <td style="text-align: center;">16</td> </tr> <tr> <td style="text-align: center;">Arch</td> <td style="text-align: center;">5</td> </tr> </tbody> </table>	Pattern of thumbprint	No of students	Whorl	6	Loop	8	Composite	16	Arch	5	3
	Pattern of thumbprint	No of students										
	Whorl	6										
	Loop	8										
	Composite	16										
Arch	5											
Able to record any 3 readings correctly .	2											
Able to record any 1-2 reading correctly.	1											
No response or one reading	0											
KB0601 - Observation												
1 (b)(i)	<p>Able to state two correct observations based on the following aspect :</p> <p>P1 : Types of pattern of thumbprint P2 : No of students</p> <p>Sample answer</p> <ol style="list-style-type: none"> 1. For the patterns of thumbprint composite, the no of students is 16. 2. For the patterns of thumbprint arch, the no of students is 5. 3. The no of students for the pattern of thumbprint composite is more than pattern of thumbprint whorl, loop and arch// vice versa 	3										
	<p>Able to state one correct observation and one inaccurate observation <u>or</u> able to state two inaccurate observation.</p> <p>Sample Answer:</p> <ol style="list-style-type: none"> 1. The no of students for the pattern of thumbprint composite is more 	2										

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	2. The no of students for the pattern of thumbprint arch is less																																														
	<p>Able to state one correct observation or able to state two observations at idea level.</p> <p>Sample Answer:</p> <ol style="list-style-type: none"> 1. Different students have different thumbprint 2. The no of thumbprints are different 	1																																													
	No response or wrong response.	0																																													
	<p><u>Scoring</u></p> <table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Correct</th> <th style="padding: 5px;">Inaccurate</th> <th style="padding: 5px;">Idea</th> <th style="padding: 5px;">Wrong</th> <th style="padding: 5px;">Score</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td rowspan="2" style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">2</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td rowspan="3" style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">2</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td rowspan="3" style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>	Correct	Inaccurate	Idea	Wrong	Score	2	-	-	-	3	1	1	-	-	2	-	2	-	-	1	-	1	-	1	-	-	2	-	1	-	-	1	-	1	1	-	0	-	1	-	1	-	-	1	1	
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-	-	1	1																																												
KB0604 - Making inference																																															
1(b)(ii)	<p>Able to state two inferences correctly based on the following aspect:</p> <p>P1 : dominant/recessive P2 : percentage of students high//more/low//less</p>	3																																													

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	<p>Sample answer</p> <ol style="list-style-type: none"> 1. The pattern of thumbprint composite is dominant. The percentage of students is high//more 2. The pattern of thumbprint arch is recessive. The percentage of students is low//less 																																										
	<p>Able to make one correct inferences and one inaccurate inference</p> <p>Sample answers:</p> <ol style="list-style-type: none"> 1. Percentage of students is high//more/low//less 2. Pattern of thumbprint composite//archi s dominant//recessive 	2																																									
	<p>Able to state one correct inference and one inference at idea level.</p> <p>Sample Answer:</p> <ol style="list-style-type: none"> 1. Different thumbprint have different percentage of students 	1																																									
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3	2	-	-	-																																							
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	-	-	2	-																																							
	-	1	1	-																																							
0	-	1	-	1																																							
	-	-	1	1																																							
KB0610-Controlling variables																																											
1(c)	<p>Able to state all 3 variables and the 3 methods to handle the variable correctly.</p> <p>Sample Answer :</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; text-align: center;">Variables</td> <td>Method to handle the variable correctly</td> </tr> <tr> <td style="text-align: center;"><u>Manipulated variable</u></td> <td></td> </tr> </table>	Variables	Method to handle the variable correctly	<u>Manipulated variable</u>		3																																					
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	<p>Pattern of thumbprint</p> <p><u>Responding variable</u></p> <p>No of students</p> <p>Percentage of students</p>	<p>Use different pattern of thumbprint (which is whorl, loop, composite, arch)</p> <p>Record the no of students (for each pattern of thumbprint)</p> <p>Calculate the percentage of students by using the formula: $\frac{\text{No of students for each patterns of thumbprint}}{\text{Total no of students}} \times 100\%$</p>	
	<p><u>Constant variable</u></p> <p><u>Total</u> no of students</p> <p>Types of variation</p> <p>Types of finger</p>	<p>Fix the same total no of students which is 35.</p> <p>Fix the same types of variation which is thumbprint.</p> <p>Fix the same types of finger which is thumbfinger</p>	
	All 6 ticks		
	Able to state 3- 5 ticks		2
	Able to state 1-2 ticks		1
	No response or incorrect response		0

KB0611-State hypothesis		
1 (d)	<p>Able to make a hypothesis based on the following aspect :</p> <p>P1 : Manipulated variable ; Pattern of thumbprint P2 : Responding variable ; No of students//Percentage of students R : Relationship</p>	3

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	<p>Sample Answer :</p> <ol style="list-style-type: none"> The no of students//the percentage of students for patterns of thumbprint composite is more than whorl, loop and arch. And vice versa. 	
	<p>Able to make a hypothesis relating the manipulated variable and responding variable inaccurately</p> <p>Sample Answer:</p> <ol style="list-style-type: none"> The no of students//percentage of students for patterns of thumbprint composi//arch//whorl//loop is more//less Different patterns of thumbprint have different no of students/percentage of students The no of students//percentage of students affected by//influence by the patterns of thumbprint. 	2
	<p>Able to state a hypothesis relating the manipulated variable at idea level, with one aspect correctly.</p> <p>Sample Answer :</p> <ol style="list-style-type: none"> Different students have different thumbprint. Thumbprint composite is dominant Thumbprint arch is recessive 	1
	<p>No response or wrong response if no P1 or P2 no mark for each.</p>	0

KB0606 – Communicating data		
1(e)(i)	<p>Able to construct a table which contain the following aspects:</p> <p>P1: Able to state the 6 titles with units correctly. P2 : Able to record all data correctly. P3 : Able to calculate the TSA/V and the rate of diffusion</p>	3

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	<p>Sample answer :</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Patterns of thumbprint</th> <th style="width: 30%;">No of students</th> <th style="width: 40%;">Percentage of students (%)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Whorl</td> <td style="text-align: center;">6</td> <td style="text-align: center;">17.14</td> </tr> <tr> <td style="text-align: center;">Loop</td> <td style="text-align: center;">8</td> <td style="text-align: center;">22.86</td> </tr> <tr> <td style="text-align: center;">Composite</td> <td style="text-align: center;">16</td> <td style="text-align: center;">45.71</td> </tr> <tr> <td style="text-align: center;">Arch</td> <td style="text-align: center;">5</td> <td style="text-align: center;">14.29</td> </tr> </tbody> </table>	Patterns of thumbprint	No of students	Percentage of students (%)	Whorl	6	17.14	Loop	8	22.86	Composite	16	45.71	Arch	5	14.29	
Patterns of thumbprint	No of students	Percentage of students (%)															
Whorl	6	17.14															
Loop	8	22.86															
Composite	16	45.71															
Arch	5	14.29															
	Any two aspects correct	2															
	Any one aspect correct	1															
	No response or wrong response.	0															
KB0607 – Relationship between space and time																	
1(e)(ii)	<p>Able to plot the graph correctly :</p> <p>Criteria:</p> <p style="margin-left: 20px;">P : Correct Axis with label, uniform scale and unit : Y axis, Percentage of students : X axis, Pattern of thumbprint</p> <p style="margin-left: 20px;">T : All 4 bars drawn</p> <p style="margin-left: 20px;">B : Bar graph</p> <p>p/s : accept histogram</p>	3															
	Any two criteria	2															
	Any one criteria.	1															
	No response or wrong response.	0															
KB0608 – Interpreting the data																	
1(f)	<p>Able to state the types of variation and explain.</p> <p>Sample answer:</p> <p>R : Types of variation : Discontinuous variation</p> <p>E1: Discrete distribution // no range values between the pattern of thumbprint.</p>	3															

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	<p>E2: Effected by genetic factors/ does not influenced//effected by environmental factor</p> <p>All three aspects</p> <p>Note : If R1 wrong, reject E1 & E2</p>	
	<p>Two aspects including <u>R1</u></p> <p>Example : R1 + E1 / R1 + E2</p>	2
	<p>Only <u>R1</u> stated</p>	1
	<p>No response or incorrect response</p>	0
KB0609 – Defining by operation		
	<p>Able to state the operational definition of discontinous variation based on the following aspects:</p> <p>P1 : distinct/clear different in characteristic P2 : determined by the no of students with different patterns of thumbprint P3 : discontinous variation affected by genetic factor</p> <p>Sample answer</p> <p>Discontinous variation is distinct/clear different in characteristic which determined by the no of students with different patterns of thumbprint. Discontinous variation affected by genetic factor.</p>	3
	<p>Any two criteria stated</p>	2
	<p>Any one criteria stated // theoretical definition</p>	1
	<p>No response or wrong response.</p>	0
KB0605 - Predicting		
1(h)	<p>Able to predict using all the following criteria/aspects :</p> <p>P : Correct prediction – Normal distribution // Bell shape graph E1 : Reason - Continous variation // no distinct/clear different E2 : Factors affecting – genetic and environment</p>	3

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	<p>Sample answer</p> <p>Normal distribution // bell shape graph because height is continuous variation // height have no distinct /clear different and it is affected by genetic and environmental factors.</p>	
	<p>Any two aspects :</p> <p>P(idea) + 2E // P + 1E</p>	2
	<p>Any one aspect :</p> <p>P(idea) + E1 // P1 (idea) + E2</p>	1
	No response or wrong response	0

KB0608 – Interpreting the data						
1(i)	<p>Able to classify all the factors in table correctly:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Continous variation</th> <th style="width: 50%;">Discontinous variation</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"> Nutrition Experience Standard of living </td> <td style="text-align: center;"> Benzene X- ray Radioactive ray </td> </tr> </tbody> </table>	Continous variation	Discontinous variation	Nutrition Experience Standard of living	Benzene X- ray Radioactive ray	3
Continous variation	Discontinous variation					
Nutrition Experience Standard of living	Benzene X- ray Radioactive ray					
	Able to get 4-5 tick correctly	2				
	Able to get 2-3 tick correctly	1				
	Able to get 1 tick or no response or wrong response	0				

TOTAL SCORE - 11 X 3 = 33 marks

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QUESTION 2

KB061201 – (KB061203 – Statement of Identified Problem) – 3m

	Criteria	Score
2(i)	<p>Able to state a problem statement relating the manipulated variable with the responding variable correctly.</p> <p>P1 – MV : The concentration of glucose P2 – RV : The rate of anaerobic respiration of yeast P3 - Question form and have question mark (what / how does.....?)</p> <p><u>Sample Answer</u> 1. How does the concentration of glucose (P1) affects the rate of anaerobic respiration in yeast (P2) ? (P3) 2. What is the effect of the concentration of glucose (P1) on the rate of anaerobic respiration in yeast in yeast (P2) ? (P3)</p>	<p>3</p> <p>P1 +P2 +P3</p>
	<p>Able to state problem statement inaccurately .</p> <p><u>Sample Answer:</u> 1. What is the effect of the concentration of glucose on respiration ? no P2 2. The rate of anaerobic respiration in yeast is affected by the concentration of glucose (no P3)</p>	<p>2</p> <p>P1 +P2/ P1 +P2/ P2 +P3</p>
	<p>Able to state a problem statement at idea level.</p> <p><u>Sample Answer :</u> 1. The concentration of glucose affects the yeast (no P2 + P3)</p>	<p>1</p> <p>P1/P2/P3</p>
	No response or wrong response	0
KB061202 (KB061203 – Making Hypothesis)-3m		
2(ii)	<p>Able to state a hypothesis relating the MV to the RV correctly</p> <p>P1 : (MV)- the concentration of glucose P2 : (RV)- the rate of anaerobic respiration in yeast// time taken for limewater turn cloudy//height of the coloured liquid in the monometer//time taken for diameter of dough to increase/balloon to double H : - relationship</p> <p><u>Sample Answer :</u></p>	<p>3</p> <p>P1 +P2 +P3</p>

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	<p>1. The higher/lower the concentration of glucose (P1), the higher/lower (H) the rate of anaerobic respiration (P2) in yeast// time taken for limewater turn cloudy//height of the coloured liquid in the monometer//time taken for diameter of dough to increase/balloon to double.</p> <p>2. As the concentration of glucose(P1) increases (H), the rate of anaerobic respiration(P2) in yeast increases// time taken for limewater turn cloudy//height of the coloured liquid in the monometer//time taken for diameter of dough to increase/balloon to double</p>	
	<p>Able to state a hypothesis inaccurately</p> <p><u>Sample Answer</u> :</p> <p>1. The concentration of glucose (P1) affects the rate of anaerobic respiration in yeast (p2 time taken for limewater turn cloudy//height of the coloured liquid in the monometer//time taken for diameter of dough to increase/balloon to double // (no H)</p>	<p>2 P1 +P2/ P1 +H/ P2 +H</p>
	<p>Able to state a hypothesis at idea level.</p> <p><u>Sample Answer</u> :</p> <p>1. The glucose concentration affects the respiration (no P2 +H)</p>	<p>1 P1/P2/H</p>
	No response or wrong response	0
(KB061203-Controlling variable)-3m		
2(iii)	<p>Able to state three variables correctly:</p> <p><u>Sample Answer</u>:</p> <p>1. Manipulated variable The concentration of glucose</p> <p>2. Responding variable The rate of anaerobic respiration in yeast//time taken for limewater turn cloudy//height of the coloured liquid in the monometer//time taken for diameter of dough to increase/balloon to double</p> <p>3. Constant variable The temperature // the volume of yeast suspension//duration/time (of activity)</p>	3
	Able to state any two variables correctly	2

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	Able to state any one variables correctly	1																																								
	No response or wrong response	0																																								
KB061205 (KB061203-Listing of Materials and Apparatus) – 3m																																										
2(iv)	<p>Able to list all the important apparatus and material correctly</p> <p><i>Sample answer:</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%; text-align: center;">Using manometer</th> <th style="width: 50%; text-align: center;">Using lime water</th> </tr> <tr> <td> <p>Materials: *Yeast // Yeast solution /suspension (5%), * glucose solution (5,10,20%) *Distilled water, Coloured water and vaselin</p> <p>Apparatus: *Test tube/boiling tube, *manometer tubes/capillary tube, beaker, measuring cylinder, retort stand, stopwatch , marker/thread rubber tubing, rubber stopper</p> <p>[Accept if not separately] [Reject if in wrong category]</p> </td> <td> <p>Materials: *Yeast // Yeast solution /suspension (5%), * glucose solution (5,10,20%) *paraffin oil Distilled water, Lime water</p> <p>Apparatus: *Test tube,boiling tube, *delivery tube, beaker, measuring cylinder, stopwatch and stoppers</p> <p>[Accept if not separately] [Reject if in wrong category]</p> </td> </tr> <tr> <td> <p>Notes:</p> <table border="1" style="width: 100%; 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	stopwatch , marker,wet towel,water bath (beaker water and Bunsen burner) and electronic balance [Accept if not separately] [Reject if in wrong category]	(beaker water and Bunsen burner) [Accept if not separately] [Reject if in wrong category]																											
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2(v)	K	Using Lime Water	Using Manometer	Using Dough	Using Balloon																								
	K1	<ul style="list-style-type: none"> ▪ Label 3 test tubes/boiling tubes (as A,B and C) ▪ Pour yeast suspension into a test tube ▪ Mix with glucose solution ▪ Connect delivery tube ▪ Pour lime water into another test tube ▪ Start stop watch ▪ Tabulate data 	<ul style="list-style-type: none"> ▪ Label 3 test tubes/boiling tubes ▪ Pour yeast suspension into a test tube ▪ Mix with glucose solution ▪ Connect stopper with rubber tubing ▪ Connect to manometer ▪ Fill manometer with coloured solution ▪ Start stop watch ▪ Mark 	<ul style="list-style-type: none"> ▪ Label 3 basin ▪ Pour yeast suspension into the basin ▪ Mix with glucose solution ▪ Mix with flour ▪ Knead into a dough ▪ Leave the dough aside ▪ Start stop watch ▪ Tabulate data 	<ul style="list-style-type: none"> ▪ Label 3 conical flask ▪ Pour yeast suspension into the basin ▪ Mix with glucose solution ▪ Cover the mouth of conical flask with a rubber balloon ▪ Leave the set-up aside ▪ Start stop watch ▪ Tabulate data 																								

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			initial/final coloured solution level <ul style="list-style-type: none"> ▪ Tabulate data 			
K2	<ul style="list-style-type: none"> ▪ 5 ml //5% yeast solution ▪ 10 ml //5% boiled glucose solution ▪ 5 ml lime water ▪ Water bath temperature 35°C 	<ul style="list-style-type: none"> ▪ 5 ml//5% yeast suspension ▪ 10 ml 5% boiled glucose solution ▪ Time 10 minutes ▪ Water bath temperature 35°C 	<ul style="list-style-type: none"> ▪ 5 ml//5% yeast suspension ▪ 10 ml 5% boiled glucose solution ▪ Time 10 minutes ▪ Water bath temperature 35°C ▪ 100 g flour 	<ul style="list-style-type: none"> ▪ 5 ml//5% yeast suspension ▪ 10 ml 5% boiled glucose solution ▪ Time 10 minutes ▪ Water bath temperature 35°C ▪ Type of balloon 		
K3	<ul style="list-style-type: none"> ▪ <u>Record</u> the time taken for the lime water turns cloudy using <u>stopwatch</u> ▪ <u>Calculate</u> the rate of respiration using formula : <u>1/ time</u> 	<ul style="list-style-type: none"> ▪ <u>Record</u> the final height of coloured solution level using <u>ruler</u> ▪ <u>Calculate</u> the rate of respiration using formula : <u>change in height/time</u> 	<ul style="list-style-type: none"> ▪ <u>Record</u> the time taken for the diameter of the dough to double using <u>stopwatch</u> ▪ <u>Calculate</u> the rate of respiration using formula : <u>change in height/time</u> 	<ul style="list-style-type: none"> ▪ <u>Record</u> the time taken for the diameter of the balloon to double using <u>stopwatch</u> ▪ <u>Calculate</u> the rate of respiration using formula : <u>change in height/time</u> 		
K4	<ul style="list-style-type: none"> ▪ Repeated by replacing 5% glucose solution with distilled water, 10% 	<ul style="list-style-type: none"> ▪ Repeated by replacing 5% glucose solution with distilled water, 10% glucose solution 	<ul style="list-style-type: none"> ▪ Repeated by replacing 5% glucose solution with distilled water, 10% 	<ul style="list-style-type: none"> ▪ Repeated by replacing 5% glucose solution with distilled water, 10% 		

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	glucose solution and 20% glucose solution	and 20% glucose solution	glucose solution and 20% glucose solution	glucose solution and 20% glucose solution
K5	<ul style="list-style-type: none"> ▪ 5% Glucose solution is boiled to remove any dissolved oxygen and is cooled ▪ A thin layer of paraffin oil then is put on the top of the mixture on the boiling tube ▪ The test tubes containing yeast and glucose are closed tightly with rubber stopper (with delivery tube) ▪ The experiment is repeated 3 times to get average result 	<ul style="list-style-type: none"> ▪ 5% Glucose solution is boiled to remove any dissolved oxygen and is cooled ▪ A thin layer of paraffin oil then is put on the top of the mixture on the boiling tube ▪ The test tubes containing yeast and glucose are closed tightly with rubber stopper (with delivery tube) ▪ Vaseline is used to make sure all the joints of the apparatus are airtight water ▪ The experiment is repeated twice to get average result 	<ul style="list-style-type: none"> ▪ Cover the dough using wet towel ▪ The experiment is repeated 3 times to get average result 	<ul style="list-style-type: none"> ▪ The mouth of the conical flask is covered tightly with the rubber balloon ▪ The experiment is repeated 3 times to get average result

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	<p>Notes : K1 : Preparation of materials and apparatus (all 3) K2 : Operating the constant variable (any 1) K3 : Operating the responding variable (any 1) K4 : Operating the manipulated variable (any 1) K5 : Steps to increase reliability of results accurately / precaution (any 1)</p> <p>Able to describe all the 5'K'</p>	3												
	Any 3-4 'K'	2												
	Any 1-2 'K'	1												
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KB061203 – Planning Investigation (KB061203-Data Presentation)- 2m														
2(vi)	<p>Able to construct a table to record data with units</p> <ul style="list-style-type: none"> - All titles with unit 1m - Manipulated data 1m - Data is not required 1 <p>[using manometer]</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: center;">Concentration of glucose solution (%)</th> <th style="text-align: center;">The height of coloured liquid in the manometer (mm)</th> <th style="text-align: center;">The rate of anaerobic respiration in yeast (mm min⁻¹)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">10</td> <td></td> <td></td> </tr> <tr> <td style="text-align: center;">20</td> <td></td> <td></td> </tr> </tbody> </table>	Concentration of glucose solution (%)	The height of coloured liquid in the manometer (mm)	The rate of anaerobic respiration in yeast (mm min ⁻¹)	5			10			20			3
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