Biology Practical Revision

Instrument	Values can be recorded to the	Examples		
	nearest			
Burette	0.05 cm ³	25.00 cm ³ , 10.05 cm ³		
Measuring cylinder	0.5 cm ³	14.0 cm ³ , 14.5 cm ³		
Electronic balance	0.1 g	150.0 g, 151.8 g		
(Copy completely)	0.01 g	131.00 g, 189.30 g		
Ruler	0.1 cm	11.0 cm, 15.8 cm		
Thermometer	0.5 °C	40.0 °C , 40.5 °C		
Stopwatch	1s	23 s, 50s		

Precision

<u>Units</u>

- Density: gcm⁻³
- Rate: s⁻¹

Graph answering

• $x \rightarrow y$ axis

Other important things

- 1. Describe 2 ways in which your method of using the syringe ensured the dilutions were made accurately. + WHAT DID YOU DO / HOW?
 - Remove the bubbles in the syringe by inverting and tapping the syringe.
 - Use a syringe that is only slightly larger than the volume (e.g. use a 5cm³ syringe to measure 2 cm³, 10cm³ syringe to measure 9cm³)
 - Do not cross-contaminate the syringe. (Dedicate one syringe to each solution)
 - Wash the syringe with distilled water and dry thoroughly with paper towel to prevent dilution of the solutions.

2. Why was iodine added to the onion epidermis?

- To stain the onion epidermis for easy viewing under the microscope.
- 3. Why calculate the percentage in length?
 - Different cells have different initial lengths
 - Percentage change = can accurately reflect how much the cell contents have shrunk / increased in size. → can compare to what they were like in the beginning.
- 4. Why take more than 1 readings?
 - Calculate average
 - Identify anomalies

- 5. The comparison of the diameters would be ideal if the three slices of eggplant came from one section of the same fruit. Why?
 - Same starting water potential of the cell sap of the plant tissues from the same fruit.
 - Hence more reliable comparison can be made.
- 6. Why rinse the vising tubing?
 - Remove the starch / amylase / named solution on the exterior of the bag

<u>Variables</u>

• TLVTCM

Food tests

Test for starch: lodine test

- 1. Add 2-3 drops of iodine onto the food substance.
- 2. If iodine solution turns from brown to blue-black, starch is present. If iodine remains brown, there is no starch present.

Test for reducing sugar: Benedict's test

- 1. Add 2cm³ of food sample into a test tube containing 2cm³ of Benedict's solution.
- 2. Shake well.
- 3. Place the test tube into a boiling water bath for 15 minutes.
- 4. A positive result ranges from green to brick-red. A green precipitate shows a small amount of reducing sugar. An orange precipitate shows a moderate amount of reducing sugar. A brick-red precipitate shows a large amount of reducing sugar.

Test for protein: Biuret test

- 1. Add 2cm³ of sodium hydroxide to 2cm³ of food sample. Shake well.
- 2. Add 1% copper (II) sulfate solution, shaking after each drop.
- 3. A violet colouration shows the presence of protein. A blue solution shows the absence of protein.

Test for fats: Ethanol emulsion test

- 1. Add 2cm³ of ethanol to a test tube containing a mixture. Shake well.
- 2. Add 2cm³ of water to the mixture. Shake well.
- 3. The presence of a white emulsion shows the presence of fats. The clear and colourless solution shows the absence of fats.

<u>Planning</u>

Туре	Requirements
Effect of temperature on	1. Constant + constant pH
enzyme activity	2. Dependent
	3. Independent
	4. Reliability
	5. Control
	6. Analysis
Effect of nH on enzyme	1 Constant + constant temperature
activity	2 Dependent
activity	3 Independent
	A Reliability
	5 Control
	6 Analysis
Effect of concentration	1. Constant
on potato	2. Initial length / weight – final length / weight
	3. Dependent
	4. Independent
	5. Reliability
	6. Control
	7. Graph
	8. Analysis

Sources of error

Туре	Source of error	How does it affect?	Improvement
Majority of the	Time lapse in adding	Inaccurate readings	Conduct
experiments	iodine solution in the	from expected	experiments with
(enzyme,	mixture		staggered start
osmosis)		**More/less?	times
	Time lapse in reading the		
	volume		
	Time lapse in reading the		
	length		
Osmosis	Varied volume of water	Inaccurate readings	
	adhered to surface of	from expected	
	Viking tubing		
		**More/less?	
	Evaporation of water	Concentration of salt	Cover petri dish
	from salt solution	solution will increase,	with a lid
		hence water potential	
		of salt solution	
		decreases. Length of	

		potato shorter than expected.	
Bubbling of gas into limewater (calcium hvdroxide)	Different volume of gas dissolved in the solution	Lesser gas volume measured than expected	Collect gas with a gas syringe
Yeast	Insufficient oxygen	Aerobic respiration may occur and hence the rate of reaction will be slower. Longer time taken than expected.	Stirring to allow aeration
Calorie count	Food sample is not completely burnt	Change in temperature is lower than expected hence calculated value is lower than expected.	
	Loss of heat to the surroundings	Change in temperature is lower than expected hance calculated energy value is lower than expected.	
Capillary tube used	When apparatus is moved, the liquid level in the capillary tube changes	Liquid level in the capillary wall will shift inaccurate readings from expected	Clamp more tightly
colours	Subjective judging of colour	Inaccurate readings from expected	Use a colourimeter connected to a data logger Slow down the
			reaction by using less enzyme/substrate, to increase the time taken to reach the end- point
Variation experiment	Small sample size	The results is not representative of the whole population	Increased sample size
Homeostasis	Loss of heat to the surroundings	Change in temperature is higher than expected	Use styrofoam cups for insulation
Effect of varying chloroplast concentration	Temperature of the set- up not consistent/heat from the lamp causes temperature to be not consistent	Time taken for decolourisation is lesser than expected as the temperature of the environment increases	Carry out experiment in a thermostatically controlled water bath

on the rate of		from the heating of the	
photosynthesis	Difficulty in gauging the	lamp	Use a colourimeter
	exact amount at which		connected to a
	the decolourisation	May increase or	data logger
	occurs/subjective colour	decrease the time taken	
	interpretation		
Effect of	Potato tissues are of	Shorter travelling	Use a taller
catalyse in	different lengths, hence	distance for longer	container so that
hydrogen	travelling distance is	potato tissues. Hence	the difference in
peroxide	lesser	time taken is shorter	length becomes
(measure the		than expected	insignificant
time taken for			
the plant			Measure the
tissue to float)			volume of oxygen
			using a gas syringe