



# THE PIQUE LAB LEARNING CENTRE

Primary School Science Programme



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## EXPERIMENTAL TECHNIQUES

## MASTERCLASS

Answer Booklet

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Name: \_\_\_\_\_

Class: \_\_\_\_\_

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## EXPERIMENTAL TECHNIQUES MASTERCLASS

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### **#1: AIM OF THE EXPERIMENT**

<b>Qn</b>	<b>Answer</b>
<b>Example 1</b>	Sam was trying to find out how the brand of insecticide affects the number of fruit flies still alive after 20 minutes.
<b>Q1</b>	John was trying to find out if the presence of light affects the germination of seeds.

### **#2: RELATIONSHIP TYPE QUESTION**

<b>Qn</b>	<b>Answer</b>
<b>Example 2</b>	As the temperature of the water increases until 25 °C, the rate of photosynthesis of plant A increases. As the temperature of the water increases beyond 25 °C, the rate of photosynthesis of plant A decreases.
<b>Q2</b>	As the temperature of the water increases, the amount of dissolved oxygen decreases.

### **#3: HOW DO WE ENSURE A FAIR TEST?**

<b>Qn</b>	<b>Answer</b>
<b>Example 3</b>	Applying fair test type 2 template structure: <ol style="list-style-type: none"><li>1. More than one variable has been changed in the experiment.</li><li>2. The age of the girls was not kept the same,</li><li>3. and this would affect the size of their lungs, which would affect the amount of air each girl breathes out into the balloon, affecting the size of the balloon.</li></ol>
<b>Q3</b>	Yes. There is only one changed variable, which is the size of flowers that affects the number of bees that landed on them.
<b>Q4</b>	More than one variable would have been changed in the experiment. The location of each beaker would not be kept the same and this would affect the temperature/ wind speed in the location, which would affect the time taken for the liquid to evaporate completely.
<b>Q5</b>	As the thickness of each material increases, the rate of heat conduction through the material decreases. Thus, keeping the thickness of the materials the same ensures that there would be only one changed variable, which is the type of material that affects the results, ensuring a fair test.

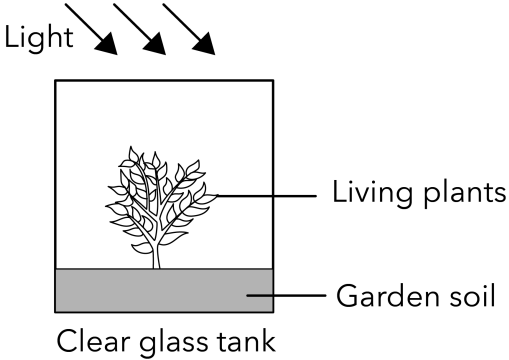
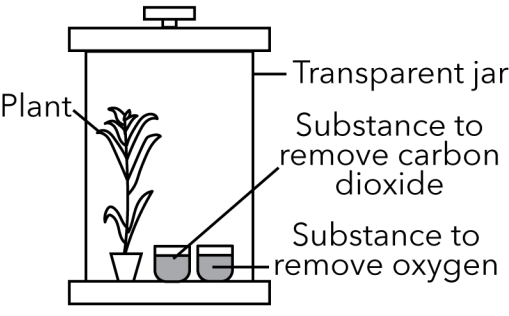
### **#4: HOW DO WE ENSURE THAT THE RESULTS ARE RELIABLE?**

<b>Qn</b>	<b>Answer</b>
<b>Example 4</b>	James conducted the same experiment for three attempts to ensure that the results are consistent before taking the average change in James' heart rate for a more reliable result.
<b>Q6</b>	For each type of paper, he should carry out the experiment at least 3 times to ensure that the results are consistent, before taking the average number of wooden blocks the paper can withstand for a more reliable result.

**#5: STATING A HYPOTHESIS OF THE EXPERIMENT**  
**&**  
**#6: MAKING A CONCLUSION FROM THE RESULTS OF THE**  
**EXPERIMENT**

<b>Qn</b>	<b>Answer</b>
<b>Example 5A</b>	As the number of bulbs arranged in series increases/decreases, the brightness of each bulb increases/decreases. OR The number of bulbs arranged in series does not affect the brightness of each bulb.
<b>Example 5B</b>	As the number of bulbs arranged in series increases, the brightness of each bulb decreases.
<b>Example 6A</b>	Both pure water and tap water are conductors/insulators of electricity. OR Pure/Tap water is a conductor of electricity while tap/pure water is an insulator of electricity.
<b>Example 6B</b>	Pure water is an insulator of electricity while tap water is a conductor of electricity.
<b>Q7</b>	As the distance of the torch from the wall increases/decreases, the height of the shadow formed increases/decreases. OR The distance of the torch from the wall does not affect the height of the shadow formed.
<b>Q8</b>	Liquid N expands the fastest, followed by Liquid L, Liquid M and then Liquid K.

## #7: WHAT IS THE PURPOSE OF THE CONTROL SET-UP?

Qn	Answer														
<b>Example 7A</b>	<table border="1"> <thead> <tr> <th>Items for Set-up C</th><th>Tick</th></tr> </thead> <tbody> <tr> <td>Clear glass tank</td><td>✓</td></tr> <tr> <td>Tracing paper</td><td></td></tr> <tr> <td>Black paper</td><td></td></tr> <tr> <td>Living plants</td><td>✓</td></tr> <tr> <td>Garden soil</td><td>✓</td></tr> <tr> <td>Light</td><td>✓</td></tr> </tbody> </table>	Items for Set-up C	Tick	Clear glass tank	✓	Tracing paper		Black paper		Living plants	✓	Garden soil	✓	Light	✓
Items for Set-up C	Tick														
Clear glass tank	✓														
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<b>Example 7B</b>	 <p style="text-align: center;"><b>Set-up C</b></p>														
<b>Example 7C</b>	Set-up C acts as a control set-up to compare and confirm that the rate of photosynthesis of plants is caused only by the amount of light received by the plants and not any other variable in the experiment.														
<b>Q9a</b>															
<b>Q9b</b>	The third set-up acts as a control set-up to compare and confirm that photosynthesis in plants is caused only by the presence of either oxygen or carbon dioxide and not any other variable in the experiment.														