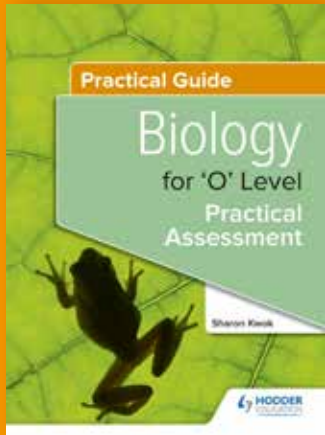


# Practical Guides for 'O' Level Practical Assessment Biology / Chemistry / Physics

Biology, Chemistry and Physics for 'O' Level are based on the latest Ministry of Education syllabus, designed to provide instructions on how to approach the practical examination as well as develop the essential skills in answering questions effectively.



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**Experiment 1.1**

You are advised to read the whole question before you start.

You are going to investigate the effect of four different concentrations of glucose solutions on potato tissue.

**Part 1**

You are provided with:

- A peeled potato.
- A pair of forceps or tweezers.
- A kitchen knife or scalpel.
- A white tile.
- A 15 cm rule.
- Four glucose solutions of different concentrations (G1 to G4).
- Four beakers.
- A stopwatch.
- A graph paper mounted on a stand.
- A retort stand.
- A piece of cork.
- A pin.
- Four pieces of clean dry filter paper or paper towels.

**Step 1** Label the four beakers G1 to G4.

**Step 2** Carefully cut five strips of potato tissue, each measuring 80 mm × 5 mm × 5 mm.

**Step 3** Place one potato strip into each beaker G1 to G4. Leave the last strip aside.

**Step 4** Pour glucose solutions G1 to G4 into the respective beakers. Ensure that the potato strips are completely covered by the glucose solutions. Start the stopwatch.

**Step 5** Clamp the piece of cork to the retort stand.

**Step 6** Insert a pin near the end of the last potato strip and attach the potato strip securely on to the cork. Ensure that the end of the potato strip is at the edge of the cork.

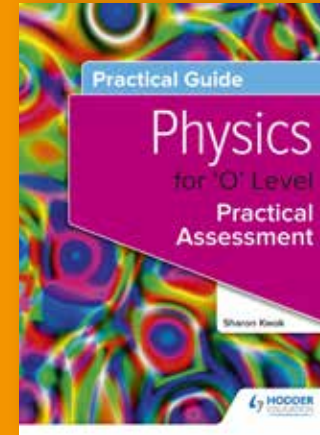
**Step 7** Place the mounted graph paper behind the potato strip as shown.

**Step 8** On the graph paper, mark the two ends of the potato strip. Label both points as X. Remove the potato strip.

**Step 9** After 20 minutes, remove the potato strips from G1 to G4 and dry each of them with a piece of filter paper or paper towel.

**Step 10** Repeat steps 6 to 8 for the four potato strips. Instead of X, label the points on the graph paper as G1 to G4 respectively.

Practise experiments based on commonly tested themes with a focus on planning for practical assessments.



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**Answers**

**Experiment 1.1**

In this experiment, you will investigate the period of a pendulum.

You are provided with:

- A cube on a string
- A retort stand with clamp and split cork
- A metre rule
- A stopwatch

Set up the apparatus as shown in the diagram, with the distance  $D$ , between the point of support to the top of the bench, approximately 50 cm.

(a) Measure  $D$ . [1]  
 $D = 0.500 \text{ m} (0.495 \text{ m} - 0.505 \text{ m})$

(b) Adjust the length of the string until the height of the centre of the cube above the bench  $h$  is 15.0 cm. Displace the cube slightly to the side and release it so that it swings freely. Record the time taken for  $n$  oscillations. [1]

(c) Suggest how  $h$  can be measured more accurately. You may use additional apparatus. [1]  
Use a set square to check that the metre rule is perpendicular to the bench before measuring  $h$ .  
Draw a line around the middle of the cube and measure  $h$  from the line to the bench.  
Attach a pointer to the middle of the cube and measure  $h$  from the pointer to the bench.

(d) Repeat with  $h = 20.0 \text{ cm}, 25.0 \text{ cm}, 30.0 \text{ cm}, 40.0 \text{ cm}$ . Record your results for  $h$  and  $t$  in a suitable table. Include your value from (b). [4]

$h / \text{m}$	$t / \text{s}$	$T / \text{s}$
0.150	10.0 (10.0-10.0)	1.00 (1.00-1.00)
0.200	12.0 (12.0-12.0)	1.20 (1.20-1.20)
0.250	14.0 (14.0-14.0)	1.40 (1.40-1.40)
0.300	16.0 (16.0-16.0)	1.60 (1.60-1.60)
0.400	19.0 (19.0-19.0)	2.36 (2.36-2.36)

(e) Calculate the period  $T$  and  $T^2$  for each value of  $h$  and add these into your table. [2]

(f) Using the grid provided, plot a graph of  $T^2$  against  $h$ . Start your axes from the origin (0, 0). Draw a straight line of best fit. [4]

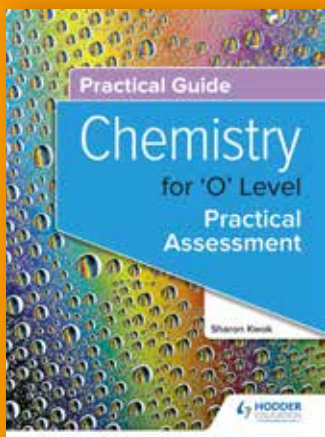
**Thought Process**  
Most difficultly necessary in measuring accurately is because the pendulum ball is spherical round.

**Marking**  
Award 1 point for plausible alternative possible.

**Assessing Skill**  
Award 1 point for calculated correctly [1].  
Award 1 point for calculated correctly [1].

**Thought Process**  
It is necessary to draw perpendicular for direct measurement of the graph. Measure the length of the string through the origin (0, 0).

**Assessing Skill**  
All plotted points may not be on the line. There should be plotted points alternating above and below the line at approximately equal distances from the line.



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**Crystallization**

- Put the solution into an evaporating dish.
- Heat solution until saturated.
- Leave to cool until crystals form.
- Filter out crystals.
- Rinse crystals with a small volume of cold distilled water.
- Dry crystals with clean filter paper.

**Filtration**

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