

# Igcse Physics 0625 0972

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Month	Week	Dates	Sessions	Plan
June	1	<2024-06-24 Mon> <2024-06-25 Tue>	Introduction      Measurements	Units and measurements Lengths Weights Volume Density Length Repeatability Accuracy Errors
July	2	<2024-07-01 Mon> <2024-07-02 Tue>	Measurements	Measuring time Estimation Practical examples
		TBD	Practical	Measure Earth's circumference Measure Density of a human
		TBD	Recall	Practice problems and quiz

## 1 Physics

### 1.1 Units, Measurements and Accuracy

The aim of this unit is to describe different methods and aspects of physical measurements. Introduction to inaccuracy and errors. Types units and recall of all the things they learned about lengths, weights, volumes Introduction to density.

Practical measurements.

1. What are units?
2. How is length measured?
3. Accuracy or error in measurements.
4. Measuring earth's circumference.
5. Volumes.
6. Mass.
7. Density.
8. Measuring density of a human being.

### 1.1.1 Experiments

1. Measure a height of a building. Measure length of the shadow of the building. Measure length of a shadow of a meter stick.

$$\begin{array}{rcl}
 +---= & & \\
 | & | & = \\
 a| & | & = \quad | - \\
 | & | & = \quad b| - \\
 +----- & & |==== \\
 & c & d
 \end{array}$$

$$\frac{a}{b} = \frac{c}{d} \therefore a = \frac{b * c}{d}$$

1. Measure circumference of the earth. Find which city has zero shadow day today and measure a shadow of long stick. Use Eratosthenes's method to calculate circumference of Earth.
2. Measuring density of a human. Dunk a child in a drum of water?

## 1.2 Lecture 1 - 2 (June 24th, 25th):

### 1.2.1 Equipment:

Needles, Tennis balls, Measuring stick Vernier caliper, protractor Weighing machines,

### 1.2.2 Brief: Introduction to physics

Introduced scientific method and its application to physics. We touched briefly about scope of physics and its day to day relevance. We touched upon fundamentals of mathematics required for physics (the language of physics/science). Children learned about measuring different quantities like length, weight, volume. Fundamental units (length, time, weight) as well as derived units (density). were introduced.

### 1.2.3 Transcript:

What is physics? Physics is a branch of science, Its roots are in curiosity of the man to find out answer to the question. The question of The life, the universe and everything in it.

Scientific method.

1. Make a hypotheses, based on observed data.
2. Find the limitations.
3. Create an experiment to verify the hypotheses.
4. If the experiment succeeds, confidence on the theory increases.
5. If the experiment fails???? hypotheses MUST BE WRONG or at least missing something.

In physics we deal with Daily objects (Juggle tennis balls)

To absolute large, the end of the universe

And to the beginning and end of the TIME.

To absolute small, (show the needle and ask to look at the pointed tip)

Size of a needle point? :  $10^{-3}m$

Size of hydrogen atom :  $0.5 * 10^{-10}m$

Size of carbon atom:  $1.54 * 10^{-10}m$

This gives us

$2 * 10^7$  Hydrogen atoms or

$6.66 * 10^6$  Carbon atoms

How do we measure something?

Units

Recall Maitreyi's stick

#### 1.2.4 Fundamental Units:

Length :

$m$

Mass :

$kg$

Time :

$sec$

### 1.2.5 Derived units

Volume :

$$m^3$$

Density :

$$\frac{kg}{m^3}$$

## 1.3 Lecture 3 - 4 : July week 1 (1st and 2nd)

### 1.3.1 Brief: Accuracy of measurements and measuring time

We discussed multiple ways of increasing accuracy of measurements. We discussed how to measure time. Direct measurements involve clocks. Principles of clocks (pendulum). Solved problems regarding pendulum and discussed properties of pendulum.

### 1.3.2 Instruments

1. Accuracy of instruments
2. Increasing accuracy
3. Measurement of time

### 1.3.3 Direct measurements:

Measuring interval of pendulum

### 1.3.4 Indirect measurement:

Measuring thickness of a paper. Measuring diameter of a sub mm tube.

### 1.3.5 Homework:

1. Read chapter 1 and take notes in rough book of main points. and solve in chapter problems for chapter 1.
2. Solve in chapter problems in rough book (Not end of chapter problems).