**KENYA CERTIFICATE OF SECONDARY EDUCATION**

**FORM I - PHYSICS SYLLABUS**

[**1.1.0 Introduction to Physics (4 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Introduction/Introduction.htm)

[**2.0.0 Measurements 1 (12 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Measurements/Measurements.htm)

[**3.0.0 Force (16 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Force/Force.htm)

[**4.0.0 Pressure (24 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Pressure/Pressure.htm)

[**5.0.0 Particulate Nature of Matter (12 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Matter/Matter.htm)

[**6.0.0 Thermal Expansion (12 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Expansion/Expansion.htm)

[**7.0.0 Heat Transfer**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Heat/Heat.htm)

[**8.0.0 Rectilinear Propagation of Light and Reflection at Plane Surface (16 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Light/Light.htm)

[**9.0.0 Electrostatics (12 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Electrostatics/Electrostatics.htm)

[**10.0.0 Cells and Simple Circuits (12 Lessons)**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Circuits/Circuits.htm)

**1.0.0 INTRODUCTION TO PHYSICS (4 LESSONS)**

[**1.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Introduction/Obj_Introduction.htm)

1.2.1 Physics as a Science(reference to Primary Science Syllabus)

1.2.2 Meaning of Physics

1.2.3 Branches of Physics

1.2.4 Relation between Physics, other subjects and technology

1.2.5 Career opportunities in Physics

1.2.6 Basic laboratory safety rules

**2.0.0 MEASUREMENTS I (12 LESSONS)**

[2**.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Measurements/Obj_Measur.htm)

2.2.1 Definition of length, area, volume, mass, density and time

2.2.2 [SI units and symbols](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Measurements/KCSE-%20Form%20I%20Physics%20-%202.2.2%20SI%20units%20and%20symbols.htm)

2.2.3 Estimation of quantities

2.2.4 Conversion of units

2.2.5 Measuring instruments

2.2.6 Experiments on density

2.2.7 Problems on density

**3.0.0 FORCE (16 LESSONS**)

[**3**.1.0 Specific Objectives](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Force/Obj_Force.htm)

By the end of this topic, the learner should be able to:

a) define force and state its SI unit

b) describe types of forces

c) describe experiments to illustrate cohesion, adhesion and surface tension

d) state the effects of force

e) state the difference between mass and weight

Q state the relation between mass and weight, W = mg

g) define scalar and vector quantities

h) solve numerical problems involving W = mg.

3.2.1 Definition of force

3.2.2 Types of forces (including cohesive, adhesive and surface tension)

3.2.3 Experiments to demonstrate cohesion, adhesion and surface tension.

3.2.4 Effects of force

3.2.5 Mass, weight and their relationship

3.2.6 Scalar and vector quantities

3,2.7 Problem involving W = mg (take g = 10 N/kg)

### ****4.0.0 PRESSURE (24 Lessons)****

### [4.1.0 Specific Objectives](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Pressure/Obj_Pressure.htm)

By the end of this topic, the learner should be able to:

a) define pressure and state its units

b) determine pressure exerted by solids

c) describe experiments to investigate factors affecting  pressure in fluids;

d) derive the formula P = rgh

e) state the principle of transmission of pressure in fluids (Pascals principle)

f) explain atmospheric pressure and its effect

g) state and explain the applications of pressure

h) solve numerical problems involving pressure.

### 4.2.1 Definition of pressure

### 4.2.2 Pressure in solids

### 4.2.3 Factors affecting pressure in fluid (Experimental treatment required)

### 4.2.4 Derivation of P = rgh

### 4.2.5 Atmospheric pressure

### 4.2.6 Simple mercury barometer, manometers

### 4.2.7 Applications of pressure: drinking straw, syringe, siphon, hydraulic press, hydraulic brakes, bicycle pump, force pump, lift pump

### 4.2.8 Problems on pressure

### 4.3.0 Project Work

### 4.3.1 Construct a hydraulic press model.

### 5.0.0 PARTICULATE NATURE OF MATTER (12 Lessons)

[**5.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Matter/Obj_Matter.htm)

By the end of this topic, the learner should be able to:

a) show that matter is made up of tiny particles

b) describe experiment to show that particles of matter are at constant random motion

c) explain the states of matter terms of particles

d) explain diffusion

5.2.1 Experiments to show that matter is made up of tiny particles (e.g cutting papers into small pieces dilution experiments

5.2.2 Brownian motion

5.2.3 States of matter

5.2.4 Diffusion (Graham’s law not required)

**6.0.0 THERMAL EXPANSION (12 LESSONS)**

[**6.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Expansion/Obj_Expansion.htm)

By the end of this topic, the learner should be able to:

a) define temperature

b) describe the functioning of various thermometers

c) describe thermal expansion solids, liquids and gases

d) explain expansion in tern4of particle behaviour

e) describe the unusual expansion of water and effects

f) explain the effects and applications of thermal expansion.

6.2.1 Temperature

6.2.2 Thermometers:

- liquid - in - glass,

- clinical,

- six’s maximum and minim

6.2.3 Expansion of solids, liquids and gases

6.2.4 Effects of expansion and contraction

6.2.5 Unusual expansion of water (Anomalous expansion)

6.2.6 Applications of thermal expansion include Bimetallic strip

**7.0.0 HEAT TRANSFER (12 LESSONS)**

[**7.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Heat/Obj_Heat.htm)

By the end of this topic, the learner should be able to:

a) define heat

b) state the difference between temperaure and heat

c) state and explain the modes of heat transfer

d) describe experiments to illustrate factors affecting heat transfer

e) explain applications of heat transfer.

7.2.1 Heat and temperature

7.2.2 Modes of heat transfer

7.2.3 Factors affecting heat transfer (experimental treatment required)

7.2.4 Applications of heat transfer on:

- Vacuum flask,

- Domestic hot-water system,

- Solar concentrators

**8.0.0 RECTILINEAR PROPAGATION OF LIGHT AND REFLECTION AT PLANE SURFACE (16 LESSONS)**

[**8.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Light/Obj_Light.htm)

By the end of this topic, the learner should be able to:

a) perform and describe experiments to show that light travels in a straight line

b) describe the formation of shadows and eclipses

c) explain the functioning of a pin-hole camera

d) state the laws of reflection

e) verify experimentally the laws of reflection

f) state the characteristics of images formed by plane mirrors

g) explain the applications of reflection at plane surfaces

h) solve numerical problems involving pin-hole camera and mirrors inclined at an angle

8.2.1 Rectilinear propagation of light (experimental treatment required)

8.2.2 Formation of shadows and eclipses (umbra and penumbra)

8.2.3    Pin-hole camera image formation and magnification

8.2.4    Laws of reflection

8.2.5    Images formed by plane minors, ray diagrams, parallel and inclined mirrors

8.2.6    Devices based on reflection: periscope, kaleidoscope

8.2.7    Problems on pin-hole camera and mirrors inclined at an angle

**8.3.0 Project Work**

8.3.1 Construct Pin-hole Camera, Periscope and Kaleidoscope.

**9.0.0 ELECTROSTATICS I (12 LESSONS)**

[**9.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Electrostatics/Obj_Electrostatics.htm)

By the end of this topic, the learner should be able to:

a) describe electrostatic charging of objects by rubbing

b) explain the source of electrostatic charges

c) state the two types of charges

d) state the basic law of charges

e) state the unit of charge

f) construct a simple leaf electroscope

g) explain the charging of a leaf electroscope

h) use a charged leaf electroscope to identify conductors, insulators and types of charges.

9.2.1 [Electrostatic charging of objects by rubbing (experimental treatment required)](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Electrostatics/KCSE,%20Form%20I%20Physics-9.2.1%20Electrostatic%20charging%20of%20objects%20by%20rubbing.htm)

9.2.2 Types of charges and law of charges

9.2.3 The source of charge

9.2.4 The coulomb

9.2.5 [Leaf electroscope: features, charging and discharging](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Electrostatics/9.2.5-Leaf%20Electrocsope.htm)

9.2.6 Charging by contact and by induction

9.2.7 Identification of charge

9.2.8 Conductors and insulators

**10.0.0 CELLS AND SIMPLE CIRCUITS (12 LESSONS)**

[**10.1.0 Specific Objectives**](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Circuits/Obj_Circuits.htm)

By the end of this topic, the learner should be able to:

a) draw and set-up simple electric circuits

b) identify circuit symbols

c) define electric current

d) explain the working of primary and secondary cells

e) explain the care and maintenance of secondary cells.

10.2.1 Simple electric circuits: cell, [ammeter](http://en.wikipedia.org/wiki/Ammeter), [voltmeter](http://en.wikipedia.org/wiki/Voltmeter), variable resistor, connecting wires, bulb and switches

10.2.2 [Circuit symbols](http://www.elimu.net/Secondary/Kenya/KCSE_Student/Physics/Form1/Circuits/KCSE-Form%20I%20Physics-10.2.2-Circuit%20symbols.htm)

10.2.3 Electric current and its units

10.2.4 Primary and secondary cells (simple cell, dry [Leclanche’ cell](http://en.wikipedia.org/wiki/Leclanch%C3%A9_cell), [Lead acid cell](http://en.wikipedia.org/wiki/Lead%E2%80%93acid_battery))

10.2.5 Care and maintenance of secondary cells

**10.3.0 Project Work**

10.3.1 Making a simple cell from locally available materials.