

# Appendices

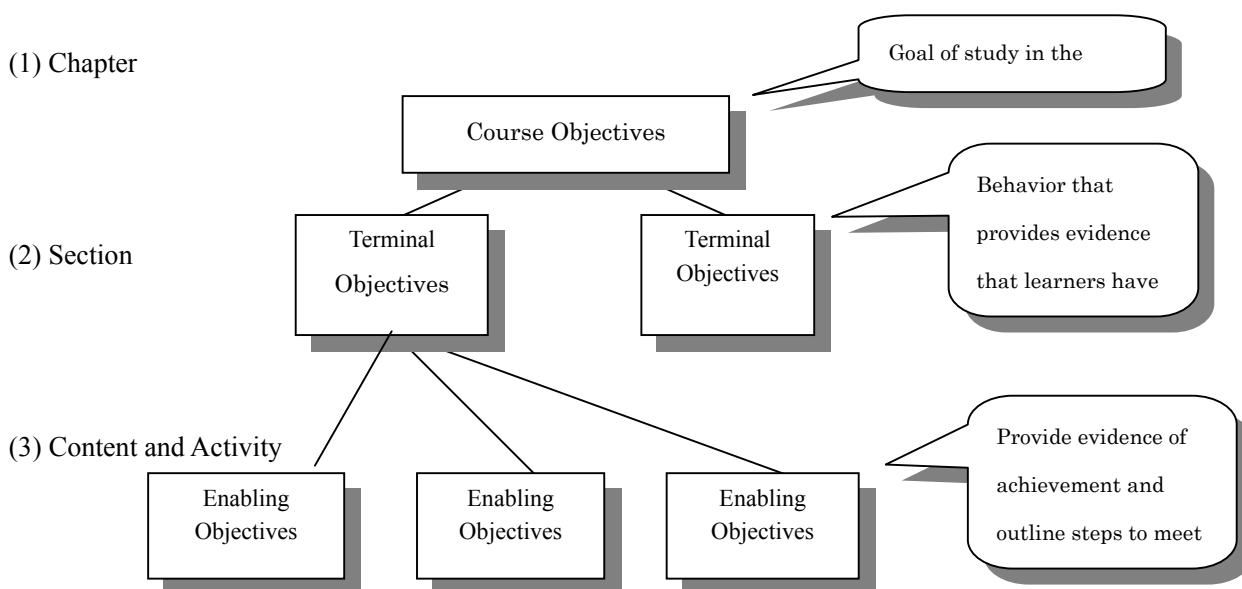
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## Appendix 1: Handbook of Textbook Analysis for Developing Digital Self-Learning Materials

### Objectives

A textbook has a hierarchical structure containing chapters, sections, which in turn have content comprising concepts, rules, definitions and exercises. Textbook analysis<sup>1</sup> seeks to clarify the educational aims and objectives of each Chapter, Section, and Content & Activity of a textbook, and to set out the relevant content in a form for ease of digitization.

The objectives are different for each stage of the textbook hierarchy as illustrated below:



### Method of Analysis

During the process of textbook analysis, 'analysis sheets' are developed for each objective described above. The first sheet will provide information on the Chapter and an overview of the goals and materials.

<sup>1</sup> The term 'curriculum analysis' is widely used and refers to a comprehensive approach. However, the term 'textbook analysis' is used in this study as the main analysis focuses solely on the textbook. Notwithstanding, supplemental materials were also analyzed to enrich digitized material.

For the analysis sheet relating to Terminal Objective, several items are described depending on the volume of each section. For the identified Enabling Objectives, the contents of the textbook are further analyzed and sheets are prepared and classified according to:

- Description of teaching contents
- Examples: Exercise & Quiz
- Concept/terminology
- Supplemental materials (workbooks, reference books, etc)

### **Steps to Develop Textbook Analysis Sheet**

#### **Step 1: Determine Identification Number**

An Identification Number (ID, Code Number) should be determined for the clear classification in each item. Any notation (sign or symbol) can be adopted to classify each item. In this analysis, the following symbols and numbers are used:

- 1) Material ID: OPM (for Chapter 9, OMW for Chapter 10)
- 2) Terminal Objectives ID: OPM-S#-TO## (S#: Section Number)
- 3) Enabling Objectives ID: OPM-S#-TO##-EO%
- 4) Exercise ID: OPM-S#-TO##-EX&
- 5) T-L ID: OPM-S#-TO##-TL¥
- 6) CT ID: OPM-S#-TO##-CT@\* #, %, &, ¥,@: Arabic number

#### **Step 2: Identify Objectives and Goals**

The teaching objectives/goal in each level (Chapter / Section / Content and Activity) should be clarified so that digitized material can be developed effectively for both input and outcome.

- Chapter: Course Objective/ Goal
- Section: Terminal Objectives
- Content and Activity: Enabling Objectives

### **Step 3: Analyze Textbook Contents**

Textbook contents should be itemized according to the following categories under each enabling objective. An analysis sheet should be developed for each category:

- A: Teaching contents (Concept, Law, Formula, Experiment, others)
- B: Examples: Exercise & Quiz
- C: Concept/terminology
- D: Supplemental materials (workbooks, reference book, etc)

### **Pilot Test**

Two chapters of a Physics textbook used in Grade 11, and having a two-month duration of instruction, were piloted as digital self-learning materials in February and March 2003. The following appendices provide sample analysis sheets based on the results of the pilot Textbook Analysis.

### List of Analyzed Items in Textbook Analysis

(Chapter 9: Optical Properties with Matter List of Objectives)

Sector Objectives		Terminal Objectives		Enabling Objectives	
OPM	<p>The goal of the chapter is to ensure that students understand the optical properties of materials, and master the following concepts:</p> <ul style="list-style-type: none"> <li>- transmission medium,</li> <li>- transparent material, refraction,</li> <li>- virtual images,</li> <li>- diopeter.</li> <li>- focal length,</li> <li>- Dispersion,</li> <li>- spectroscope,</li> <li>- farsightednes</li> <li>- near sightedness.</li> </ul>	OPM-S1-TO1	To explain the interaction of light to matter	OPM-S1-TO1-EO1	To explain the meaning of light.
				OPM-S1-TO1-EO2	To remember the properties of light.
				OPM-S1-TO1-EO3	To practically classify samples of materials in terms of transmission of light, filtration, transparency, etc.
				OPM-S1-TO1-EO4	To relate thickness of material to its transparency of light.
				OPM-S1-TO1-EO5	To explain the meaning of reflection.
				OPM-S1-TO1-EO6	To explain the meaning of incident angle.
				OPM-S1-TO1-EO7	To explain the meaning of reflected angle.
				OPM-S1-TO1-EO8	To define the two laws of reflection.
				OPM-S1-TO1-EO9	To discriminate between uniform reflection and non-uniform reflection.
				OPM-S1-TO1-EO10	To understand the concept of energy.
				OPM-S1-TO1-EO11	To understand the relationship between incident energy and transmitted, absorbed, and reflected energy.
				OPM-S1-TO1-EO12	To understand the working principle of the photometer.
				OPM-S1-TO1-EO13	To solve problems using laws and relations.
				OPM-S1-TO1-EO14	To provide examples on the conversion of light energy to other forms when it is absorbed.

Sector Objectives		Terminal Objectives		Enabling Objectives	
OPM	<p>The goal of the chapter is to ensure that students understand the optical properties of materials, and master the following concepts:</p> <ul style="list-style-type: none"> <li>- Transmission medium,</li> <li>- Transparent material,</li> <li>- Refraction,</li> <li>- Virtual images, diopeter.</li> <li>- Focal length,</li> <li>- Dispersion,</li> <li>- Spectroscope,</li> <li>- Farsightedness,</li> <li>- Near sightedness</li> </ul>	OPM-S2-TO1	To understand dispersion of light by a prism	OPM-S2-TO1-EO1	To solve different types of problems utilizing Snell's law.
				OPM-S2-TO1-EO2	To state the conditions for deriving the angle of minimum deviation in a prism.
				OPM-S2-TO1-EO3	To solve various problems relating to the prism
				OPM-S2-TO1-EO4	To state the colors which constitute white light.
				OPM-S2-TO1-EO5	To explain the analysis of light dispersed by a prism.
		OPM-S2-TO2	To understand the refraction of light by a prism	OPM-S2-TO2-EO1	To explain refraction.
				OPM-S2-TO2-EO2	To define the coefficient of refraction.
				OPM-S2-TO2-EO3	To define the angle of minimum deviation.
				OPM-S2-TO2-EO4	To explain the (incidental) refraction phenomena of light depending on varying speed of light.
				OPM-S2-TO2-EO5	To calculate the speed of light in different media with different coefficients of refraction.
				OPM-S2-TO2-EO6	To state the two laws of refraction.
		OPM-S2-TO3	To understand reflection by two spherical planes	OPM-S2-TO3-EO1	To state the equation of refraction by spherical refraction plane.
				OPM-S2-TO3-EO2	To solve numerical problems on refraction by spherical refraction plane.
				OPM-S2-TO3-EO3	To state the conditions for no refraction when light passes through two different media

Sector Objectives		Terminal Objectives		Enabling Objectives	
OPM	<p>The goal of the chapter is to ensure that students understand the optical properties of materials, and master the following concepts:</p> <ul style="list-style-type: none"> <li>- Transmission medium,</li> <li>- Transparent material,</li> <li>- Refraction,</li> <li>- Virtual images,</li> <li>- Diopeter.</li> <li>- Focal length,</li> <li>- Dispersion,</li> <li>- Spectroscope,</li> <li>- Farsightedness,</li> <li>- Near sightedness</li> </ul>	OPM-S3-TO3	To solve question on the equation of lens maker as a thin lens.	OPM-S3-TO3-EO1	By practical work, to calculate the focal length of a convex lens.
				OPM-S3-TO3-EO2	To calculate the focal length of a concave lens.
				OPM-S3-TO3-EO3	To solve numerous exercises on the general law of lenses.
				OPM-S3-TO3-EO4	To appreciate the efforts of scientists in utilizing lenses in human civilization.
				OPM-S3-TO3-EO5	To derive the equation of lens-makers for thin lenses.
				OPM-S3-TO3-EO6	To solve numerous problems using the lens-maker's equation.
		OPM-S3-TO4	To understand how to measure the focal length of Lenses.	OPM-S3-TO4-EO1	To understand the concept of dioptric power of a lens.
				OPM-S3-TO4-EO2	To understand the concept of diopter.
				OPM-S3-TO4-EO3	To calculate dioptric power of several lenses.
				OPM-S3-TO4-EO4	To be able to numerate defects in vision.
				OPM-S3-TO4-EO5	To explain the method used to correct farsightedness.
				OPM-S2-TO4-EO6	To explain the reason for farsightedness.
				OPM-S3-TO4-EO7	To explain the reason for near sightedness (myopia ).
				OPM-S3-TO4-EO8	To explain the method used to correct myopia.
				OPM-S3-TO4-EO9	To explain the concept behind a contact lens.
				OPM-S3-TO4-EO10	To solve several exercises related to correction of defects in vision.

**List of Teaching-learning Contents**

<b>T-L Contents ID :</b>	<b>T-L Contents Title :</b>
OPM-S1-To1-TL1	To define light.
OPM-S1-To1-TL2	To state the properties of light
OPM-S1-To1-TL3	To classify examples of materials to demonstrate transmission of light filtration, transparency, ...etc.
OPM-S1-To1-TL4	To relate the thickness of material and its transparency to light
OPM-S1-To1-TL5	To define the meaning of reflection
OPM-S1-To1-TL6	To explain the interaction of light with matter
OPM-S1-To1-TL7	To define the angle of reflection
OPM-S1-To1-TL8	To state the two laws relating to the angle of reflection
OPM-S1-To1-TL9	To differentiate between uniform (specular) and non-uniform (diffuse) reflection.
OPM-S1-To1-TL10	To state the law of conservation of energy
OPM-S1-To1-TL11	To explain the relationship between incident energy, and transmitted, absorbed, and reflected energies.
OPM-S1-To1-TL12	To explain the principle for the functioning of a photometer
OPM-S1-To1-TL14	To provide examples on the conversion of light energy to other forms of energy when it is absorbed
OPM-S2-To1-TL1	To state the condition that determines the occurrence of minimum deviation in a prism
OPM-S2-To1-TL2	To state the colors comprising white light
OPM-S2-To1-TL3	To explain the dispersion of light by a prism
OPM-S2-To2-TL1	To explain the concept of refraction angle
OPM-S2-To2-TL2	To explain the meaning of the coefficient of refraction.
OPM-S2-To2-TL3	To explain the meaning of angle of minimum deviation
OPM-S2-To2-TL4	To explain the refraction of light based on varying speeds of light.



<b>T-L Contents ID :</b>	<b>T-L Contents Title :</b>
OPM-S2-To2-TL5	To state the two laws of refraction
OPM-S2-To3-TL1	To state the equation of refraction by a spherical plane.
OPM-S2-To3-TL2	To state the conditions that determine the absence of refraction when light goes between two media
OPM-S3-To1-TL1	To define what is meant by a lens.
OPM-S3-To1-TL2	To classify lenses into convex and concave lenses.
OPM-S3-To1-TL3	To diagrammatically clarify concepts relating to a lens: center of curvature, principal axis, vertex of a lens, principal plane, optical center, first focal point, second focal point, focal length, real image, virtual image, real object, virtual object
OPM-S3-To1-TL4	To determine the behavior of rays incident on a convex lens after being refracted for three special cases.
OPM-S3-To1-TL5	To explain the way a lens works modeled as connected pieces of prism.
OPM-S3-To2-TL1	To distinguish the properties of images formed by a convex lens at various distances from the lens.
OPM-S3-To2-TL2	To define the concept of a thin lens
OPM-S3-To2-TL3	To obtain the general law of lenses.
OPM-S3-To2-TL1	To understand the meaning of linear magnification
OPM-S3-To2-Eo5	To mention the properties of images by lenses
OPM-S3-To2-TL6	To mention the sign convention to be followed in applying the general law of lenses
OPM-S3-To3-TL1	To derive the lens-maker equation for thin lenses.
OPM-S3-To4-TL1	To understand the concept of dioptric power of a lens
OPM-S3-To4-TL2	To evaluate some defects of vision
OPM-S3-To4-TL3	To explain the methods used to correct defects of vision

**List of Exercise and Quiz**

<b>Exercise ID :</b>	<b>Exercise Title :</b>
OPM – S1-TO1-EX1	Define transparent materials
OPM – S2-TO1-EX1	Define deviation angle
OPM – S2-TO1-EX2	Calculate the index of refraction, displacement, virtual distance (I)
OPM – S2-TO1-EX3	Calculate the index of refraction, displacement, virtual distance (II)
OPM – S2-TO1-EX4	Calculate the index of refraction, displacement, virtual distance (III)
OPM – S2-TO2-EX1	Explain or give a practical method on how to measure integer, minimum angle
OPM – S2-TO2-EX2	Calculate deviated angle, index of refraction, minimum deviation angle
OPM – S2-TO2-EX3	Calculate deviated angle, index of refraction, minimum deviation angle (I)
OPM – S2-TO2-EX4	Calculate deviated angle, index of refraction, minimum deviation angle (II)
OPM-S2-TO3-EX1	Calculate the focal length and distance of the image
OPM- S3-TO2-EX1	Define terminology
OPM- S3-TO3-EX1	Explain or state the procedure for measuring coefficient (f.r)
OPM- S3-TO3-EX2	Calculate the distance of the image, magnification and focal length (I)
OPM- S3-TO3-EX3	Calculate the distance of the image, magnification and focal length (II)
OPM- S3-TO3-EX4	Calculate the distance of the image, magnification and focal length (III)
OPM- S3-TO4-EX1	Explain or give a reasons for some phenomena related to the application of lens
OPM- S3-TO4-EX2	Calculate the dioptric of lenses, and explain the defects of eyes (I)
OPM- S3-TO4-EX3	Calculate the dioptric of lenses, and explain the defects of eyes (II)

<b>ID Concept / Terminology :</b>	<b>Concept / Terminology Title :</b>
OPM-S1-To1-CT1	Reflection
OPM-S1-To1-CT2	Transmission
OPM-S1-To1-CT3	Absorption
OPM-S1-To1-CT4	Diffuse reflection
OPM-S1-To1-CT5	Specular reflection
OPM-S1-To1-CT6	Reflection coefficient.
OPM-S1-To1-CT7	Law of reflection
OPM-S1-To1-CT8	Transmission coefficient
OPM-S1-To1-CT9	Absorption coefficient
OPM-S1-To1-CT10	Incident light energy
OPM-S2-To2-CT1	Refraction
OPM-S2-To2-CT2	Angle of refraction
OPM-S2-To2-CT3	Angle of deviation
OPM-S2-To2-CT4	Snell's law
OPM-S3-To1-CT1	Lens
OPM-S3-To1-CT2	Convex lens
OPM-S3-To1-CT3	Concave lens
OPM-S3-To1-CT4	Concepts relating to the lens (Center of curvature)
OPM-S3-To1-CT5	Concepts relating to the lens (Principal axis)
OPM-S3-To1-CT6	Concepts relating to the lens (Lens vertex)

<b>ID Concept / Terminology :</b>	<b>Concept / Terminology Title :</b>
OPM-S3-To1-CT7	Concepts relating to the lens (Principal plane)
OPM-S3-To1-CT8	Concepts relating to the lens (Optical center)
OPM-S3-To1-CT9	Concepts relating to the lens ( First focal point)
OPM-S3-To1-CT10	Concepts relating to the lens (Second focal point)
OPM-S3-To1-CT11	Concepts relating to the lens (Focal length)
OPM-S3-To2-CT1	Real image
OPM-S3-To2-CT2	Virtual object
OPM-S3-To2-CT3	Thin lens I
OPM-S3-To2-CT4	Thin lens II
OPM-S3-To2-CT5	Linear magnification
OPM-S3-To4- CT1	Dioptric power of a lens
OPM-S3-To4-CT2	Diopter..
OPM-S3-To4-CT3	Contact lens

#### **List of Related Supplemental Materials**

	<b>Title of Related Supplemental Materials</b>
1	Contents, Questions, and Applications about light
2	Animation and Simulations about light
3	Experiments about Light

## Chapter 10 Oscillatory Motion and Waves

### List of Objectives

Sector Objectives		Terminal Objectives	Enabling Objectives		
OMW	The goal of the chapter is to make students understand these properties, then master the following concepts: wave displacement, amplitude, period time, frequency, restoring force, simple pendulum, wave length, longitudinal waves, harmonic motion, simple harmonic motion, reflection waves, ripple tank. Transverse waves, interference of waves, standing waves, diffraction of waves, polarization of light, refraction waves, constructive phase, stand waves, resonance, first harmonic mechanical wave, electro-magnetic wave, compression, expansion, white and dark fringes, coherent, incoherent.	101-IS-MWO	To understand Simple Harmonic Motion	OMW-S1-TO1-EO1	To understand how to determine the shape of trajectories traversed by a moving object.
				OMW-S1-TO1-EO2	To understand the concept of periodic motion.
				OMW-S1-TO1-EO3	To understand the concept of oscillatory motion.
				OMW-S1-TO1-EO4	To understand the concept of simple harmonic motion.
				OMW-S1-TO1-EO5	To conduct an experiment that demonstrates the concept of simple harmonic motion.
				OMW-S1-TO1-EO6	To understand the concept of a complete oscillation.
				OMW-S1-TO1-EO7	To be able to represent simple harmonic motion on a Cartesian graph.
				OMW-S1-TO1-EO8	To understand the concepts related to simple harmonic motion: (period, frequency, amplitude of oscillation).
				OMW-S1-TO1-EO9	To be able to determine the forces that affect the motion of a simple pendulum.
				OMW-S1-TO1-EO10	To derive the relationship that defines the frequency and period of a simple pendulum.
				OMW-S1-TO1-EO11	To solve several exercises using the equations of a simple pendulum.
				OMW-S1-TO1-EO12	To be able to experimentally determine the acceleration due to Earth's gravity using a simple pendulum.
				OMW-S1-TO1-EO13	To understand the relationship between uniform circular motion and simple harmonic motion.
				OMW-S1-TO1-EO14	To be able to define the general equation for simple harmonic motion.
				OMW-S1-TO1-EO15	To solve varied exercises using the general equation of simple harmonic motion.

Sector Objectives		Terminal Objectives		Enabling Objectives	
OMW	<p>The goal of the chapter is to make students understand these properties, then master the following concepts:</p> <p>wave displacement, amplitude, period time, frequency, restoring force, simple pendulum, wave length, longitudinal waves, harmonic motion, simple harmonic motion, reflection waves, ripple tank. Transverse waves, interference of waves, standing waves, diffraction of waves, polarization of light, refraction waves, constructive phase, stand waves, resonance, first harmonic mechanical wave, electro-magnetic wave, compression, expansion, white and dark fringes, coherent, incoherent.</p>	OMW-S2-	To understand Oscillatory Motion	OMW-S2-TO1-EO1	To explain the concept of wave motion.
				OMW-S2-TO1-EO2	To be able to describe, with an experiment, the motion of the particles of a medium as a result of the propagation of a wave through it. For example: waves in water or from a length of rope.
		OMW-S3-TO1	To understand Types Of Waves	OMW-S3-TO1-EO1	To be able to classify waves according to their nature.
				OMW-S3-TO1-EO2	To be able to classify waves according to the direction of oscillation of the particles of the medium relative to the direction of wave propagation.
				OMW-S3-TO1-EO3	To understand the concept of longitudinal and transverse waves.
				OMW-S3-TO1-EO4	To be able to practically derive the mathematical relation between wave velocity, wave-length, and frequency.
		OMW-S4-TO1	To understand Properties Of Waves	OMW-S4-TO1-EO1	To be able to determine the properties of waves.
				OMW-S4-TO1-EO2	Using the ripple tank, to experimentally deduce that reflection, refraction, interference and diffraction are all properties of waves on the surface of water (mechanical waves).
				OMW-S4-TO1-EO3	To verify Huygens' Principle.
				OMW-S4-TO1-EO4	To use Huygens Principle to explain properties of mechanical waves: (reflection, refraction, interference, and diffraction).
				OMW-S4-TO1-EO5	To learn the concept of linear superposition.
				OMW-S4-TO1-EO6	To understand the concept of interference.

Sector Objectives		Terminal Objectives		Enabling Objectives	
OMW	<p>The goal of the chapter is to make students understand these properties, then master the following concepts:</p> <p>wave displacement, amplitude, period time, frequency, restoring force, simple pendulum, wave length, longitudinal waves, harmonic motion, simple harmonic motion, reflection waves, ripple tank. Transverse waves, interference of waves, standing waves, diffraction of waves, polarization of light, refraction waves, constructive phase, stand waves, resonance, first harmonic mechanical wave, electro-magnetic wave, compression, expansion, white and dark fringes, coherent, incoherent.</p>	OMW-S4-TO1	To understand Properties Of Waves (Cont.)	OMW-S4-TO1-EO7	To distinguish between the two types of interference (constructive, and destructive).
				OMW-S4-TO1-EO8	To be able to understand the concepts of: node, nodal line, and phase difference.
				OMW-S4-TO1-EO9	To learn the conditions under which interference is constructive.
				OMW-S4-TO1-EO10	To learn the conditions under which interference is destructive.
		OMW-S5-TO1	To understand Stationary (Standing)	OMW-S5-TO1-EO1	To understand the concept of a standing wave.
				OMW-S5-TO1-EO2	To explain the process of formation of standing waves on a rope.
				OMW-S5-TO1-EO3	To understand the concepts of node and anti-node in a standing wave.
				OMW-S5-TO1-EO4	To be able to derive the relation between the length of a tight string and the wave-length of the standing waves that can form on it.
				OMW-S5-TO1-EO5	To understand the concept of resonance.
				OMW-S5-TO1-EO6	To solve various exercises.

Sector Objectives		Terminal Objectives	Enabling Objectives		
OMW	<p>The goal of the chapter is to make students understand these properties, then master the following concepts:</p> <p>wave displacement, amplitude, period time, frequency, restoring force, simple pendulum, wave length, longitudinal waves, harmonic motion, simple harmonic motion, reflection waves, ripple tank. Transverse waves, interference of waves, standing waves, diffraction of waves, polarization of light, refraction waves, constructive phase, stand waves, resonance, first harmonic mechanical wave, electro-magnetic wave, compression, expansion, white and dark fringes, coherent, incoherent.</p>	OMW-S6-TO1	To explain Interference Of Light Waves	OMW-S6-TO1-EO1	To explain how an interference fringe is formed.
				OMW-S6-TO1-EO2	To be able to appreciate the efforts of the scientist, Young.
				OMW-S6-TO1-EO3	To obtain the mathematical relation that determines the conditions under which constructive or destructive interference occurs in Young's double-slit experiment.
				OMW-S6-TO1-EO4	To enumerate the factors that determines the width of a fringe.
				OMW-S6-TO1-EO5	To recognize everyday phenomena where interference occurs.
				OMW-S6-TO1-EO6	To understand the significance of coherence in superimposed waves.
				OMW-S6-TO1-EO7	To solve numerical exercises on the interference of light diffracted by two slits.
		OMW-S7-TO1	To understand Diffraction Of Waves	OMW-S7-TO1-EO1	To be able to explain how diffraction occurs.
				OMW-S7-TO1-EO2	To mention the condition that determines the occurrence of clearest diffraction in a ripple tank.
		OMW-S8-TO1	To understand Diffraction Light Of Waves	OMW-S8-TO1-EO1	To explain the appearance of bright lines and dark lines in the single-slit experiment.
				OMW-S8-TO1-EO2	To be able to conclude the conditions that determine the occurrence of constructive interference or destructive interference in the case of light waves diffracted by a single-slit.
				OMW-S8-TO1-EO3	To solve several exercises on the law of diffraction.



Sector Objectives		Terminal Objectives		Enabling Objectives	
OMW	<p>The goal of the chapter is to make students understand these properties, then master the following concepts:</p> <p>wave displacement, amplitude, period time, frequency, restoring force, simple pendulum, wave length, longitudinal waves, harmonic motion, simple harmonic motion, reflection waves, ripple tank. Transverse waves, interference of waves, standing waves, diffraction of waves, polarization of light, refraction waves, constructive phase, stand waves, resonance, first harmonic mechanical wave, electro-magnetic wave, compression, expansion, white and dark fringes, coherent, incoherent.</p>	OMW-S9-TO1-OMW	To explain Polarization / Polarization Of Waves	OMW-S9-TO1-EO1	To understand the concept of polarization.
				OMW-S9-TO1-EO2	To be able to demonstrate experimentally the significance of polarization in distinguishing between longitudinal and transverse waves.
				OMW-S9-TO1-EO3	To understand the concepts: polarizer, analyzer, and plane of polarization.
				OMW-S9-TO1-EO4	To understand the function of an analyzer and a polarizer in the polarization of light experiment.
		OMW-S9-TO2-OMW	To explain Polarization / Polarization By Reflection	OMW-S9-TO2-EO1	To understand the principle behind sun-glasses.
				OMW-S9-TO2-EO2	To understand the concept of Brewster angle.
				OMW-S9-TO2-EO3	To solve various problems using the relationship $n = \tan \theta_B$

### List of Teaching-learning Contents

T-L Contents ID :	T-L Contents Title :
OMW-S1-To1-TL1	To determine the shapes of trajectories traversed by a moving object
OMW-S1-To1-TL2	To define the concept of periodic motion
OMW-S1-To1-TL3	To define the concept of oscillatory motion
OMW-S1-To1-TL4	To define the concept of simple harmonic motion
OMW-S1-To1-TL5	To define the concept of a complete oscillation
OMW-S1-To1-TL6	To represent simple harmonic motion on a Cartesian graph
OMW-S1-To1-TL7	To define the concepts related to simple harmonic motion: period, frequency, and amplitude of oscillation
OMW-S1-To1-TL8	To determine the forces that affect the motion of a simple harmonic pendulum
OMW-S1-To1-TL9	To derive the relationship that defines the frequency and period of a simple pendulum
OMW-S1-To1-TL10	To define the relationship between uniform circular motion and simple harmonic motion
OMW-S1-To1-TL11	To state the general equation for simple harmonic motion.
OMW-S2-To1-TL1	To define the concept of wave motion.
OMW-S3-To1-TL1	To classify waves according to their nature
OMW-S3-To1-TL2	To classify waves according to the direction of oscillation of the particles of the medium relative to the direction of wave propagation.
OMW-S3-To1-TL3	To define the concepts of longitudinal waves and transverse waves
OMW-S3-To1-TL4	To practically reach the mathematical relationship between wave velocity, wavelength and frequency.
OMW-S4-To1-TL1	To determine the properties of waves.
OMW-S4-To1-TL2	To verify Huygens' Principle
OMW-S4-To1-TL3	To state the concept of linear superposition

<b>T-L Contents ID :</b>	<b>T-L Contents Title :</b>
OMW-S4-To1-TL4	To define the concept of interference
OMW-S4-To1-TL5	To distinguish between the two types of interference.
OMW-S4-To1-TL6	To define the concepts of: node, nodal line, and phase difference
OMW-S4-To1-TL7	To understand the conditions under which interference is constructive
OMW-S4-To1-TL8	To understand the conditions under which interference is destructive
OMW-S5-To1-TL1	To define the concept of the standing wave
OMW-S5-To1-TL2	To explain the process of formation of a standing wave on a length of rope
OMW-S5-To1-TL3	To define the concepts of node and anti-node in a standing wave
OMW-S5-To1-TL4	To derive the relationship between the length of taut rope and the wavelength of standing waves that can be formed on it
OMW-S5-To1-TL5	To define the concept of resonance
OMW-S6-To1-TL1	To explain how an interference fringe is formed
OMW-S6-To1-TL2	To obtain the mathematical relationship that determines the conditions under which constructive or destructive interference occurs in Young's double-slit experiment
OMW-S6-To1-TL3	To recognize everyday phenomena where interference occurs
OMW-S6-To1-TL4	To understand the significance of coherence in superimposed waves.
OMW-S7-To1-TL1	To explain how diffraction occurs
OMW-S7-To1-TL2	To state the condition that determines the occurrence of the clearest diffraction in a ripple-tank
OMW-S8-To2-TL1	To understand the condition that determines the occurrence of constructive interference, or destructive interference in the case of light wave diffracted by a single-slit.
OMW-S9-To1-TL1	To define the concept of polarization
OMW-S9-To1-TL2	To understand the concepts of: polarizer, analyzer, and plane of polarization
OMW-S9-To1-TL3	To understand the function of an analyzer and a polarizer in the polarization of light experiment.

<b>T-L Contents ID :</b>	<b>T-L Contents Title :</b>
OMW-S9-To2-TL1	To understand the principle behind sun-glasses
OMW-S9-To2-TL2	To define the concept of Brewster's angle.

### List of Exercises and Quiz

<b>Exercise ID :</b>	<b>Exercise Title :</b>
OMW- S1-TO1- EX1	Calculate some variables related to the general formula of the wave equation
OMW-S1-TO1- EX2	Calculate some variables related to the general formula of the wave equation
OMW-S1-TO1-EX3	Define terminology
OMW-S3-TO1-EX1	Discriminate between longitudinal waves and transfer waves
OMW-S3-TO1-EX2	Discriminate between longitudinal waves and transfer waves
OMW-S3-TO1-EX3	Calculate the shortest and longest wave length transmitted by satellite
OMW- S4-TO1_ EX1	Explain how the front of the wave changes
OMW- S4-TO1-EX2	Calculate the maximum angle of incident ray to pass through a prism to its second face
OMW-S4-TO1-Ex3	Define terminology
OMW-S4-TO1-EX4	Explain the changes to a wave when it enters different media
OMW -S5-TO1- EX 1	Calculate the wave length interference wave
OMW-S5-TO1-EX2	Calculate the wave length interference wave
OMW-S7-TO1-EX1	Define diffraction
OMW-S8-TO1-EX1	Explain the width of slit, and the shape of the diffracted wave after entering the slit
OMW-S8-TO1-EX2	Calculate the relationship between the wave length and the interference
OMW-S9-TO1- EX1	Discriminate between analysis and the polarizer

### List of Concept / Terminology

ID Concept / Terminology :	Concept / Terminology Title :
OMW-S1-To1-CT1	Periodic motion
OMW-S1-To1-CT2	Oscillatory motion
OMW-S1-To1-CT3	Simple harmonic motion.
OMW-S1-To1-CT4	Complete oscillation
OMW-S1-To1-CT5	Amplitude of oscillation.
OMW-S1-To1-CT6	Period
OMW-S1-To1-CT7	Frequency.
OMW-S1-To1-CT8	Restoring force
OMW-S2-To1-CT1	Wave.
OMW-S2-To1-CT2	Wave motion
OMW-S3-To1-CT1	Mechanical wave
OMW-S3-To1-CT2	Electromagnetic wave.
OMW-S3-To1-CT3	Longitudinal wave
OMW-S3-To1-CT4	Transverse wave
OMW-S3-To1-CT5	Wavelength
OMW-S4-To1-CT1	Huygens' principle
OMW-S4-To1-CT2	Principle of linear superposition.
OMW-S4-To1-CT3	Interference of waves

<b>ID Concept / Terminology :</b>	<b>Concept / Terminology Title :</b>
OMW-S4-To1- CT4	Node
OMW-S4-To1-CT5	Nodal line
OMW-S5-To1- CT1	Standing wave
OMW-S5-To1-CT2	Loop.
OMW-S5-To1- CT3	Anti-node
OMW-S5-To1- CT	Fundamental frequency.
OMW-S5-To1-CT5	Resonance.
OMW-S6-To1-CT1	Fringe
OMW-S6-To1-CT2	Two coherent sources
OMW-S7-To1- CT1	Diffraction
OMW-S9-To1- -CT1	Polarization
OMW-S9-To1-CT2	Plane of polarization.

### **List of Related Supplemental Materials**

	<b>Title of Related Supplemental Materials</b>
1	Contents, Questions, and Applications about light
2	Animation and Simulations about light
3	Experiments about Light

## Appendix 2: Table of Contents of Physics Textbook

<First semester> September to February

### 2.1 Unit I: Mechanics

- Chapter 1: Vectors
- Chapter 2: Mechanical Equilibrium
- Chapter 3: Type of Motion (Motion along straight line, & motion in a plane)
- Chapter 4: Newton's Laws of Motion
- Chapter 5: Work & Energy
- Chapter 6: Impulse & Momentum

<Second Semester> February to June

### 2.2 Unit II: Properties of matter

- Chapter 7: Mechanical Properties of Matter (12 lessons)
- Chapter 8: Thermal Properties of Matter (12 lessons)
- Chapter 9: Optical properties with Matter (12 lessons)\*

### 2.3 Unit III: Wave and Oscillation

- Chapter 10: Oscillatory Motion and Waves (12 lessons)\*

\* Two chapters selected for piloting:

3 lessons per week for Physics Subject in school

### Appendix 3: Sample of Textbook Analysis Sheet

#### Textbook Analysis Sheet (for Physics: Specification of Materials)

It is suitable to use abbreviation of chapter title.

Describe overview of the chapter, and in particular the relevant materials.

Describe the objectives of the chapter i.e., concepts and required level of student understanding.

Describe expected difficulties of students and lessons learned by teachers for effective and efficient lessons.

Describe how teachers can identify and measure the degree to which students achieved the course objectives.

Title : Specification of Materials	Material ID (Chapter ID) : OPM
Subject : Physics	Chapter Title : Optical Properties of Matter
	Lesson Hours : 12 Lessons
Overview of Materials :	
This chapter deals with the properties of several different types of matter. Regarding mechanical properties, the state of matter will be examined, and in particular how the three matters (solid, liquid and gas) change their state by external or internal force.	
Course Goal :	
The goal of the chapter is to ensure that students understand the properties of matter and master the following concepts: state of matter; elasticity; stress; deformation; elastic modulus; heat transfer; heat insulation; thermal equilibrium; light reflection; refracted light; light transmission and dispersion of light, etc.	
Target Learners :	
Grade 11 students	
Instructional Remarks :	
It is important for students to obtain practical skills by solving mathematical exercises containing laws of Physics and relevant formulae. - It is important for students to understand the relationships and applications between study, society, and science and technology by learning the process of heat transfer and central heating systems, as well as learning the use of optical materials etc.	
Assessment Method :	
To understand all concepts described in the Chapter - To solve exercises dealing with the following formulae and laws: (formulae) stress, deformation, elastic force, (law) Snell's law, Newton's law of Cooling - To explain the following matters and phenomena; freezing, deformation, refraction, dispersion of light by prism - To conduct experiments and practice	



**Textbook Analysis Sheet (for Physics) : Terminal Objectives**

State objectives and goals within the section	Title : Terminal Objectives	Material ID : OPM
	Subject : Physics	
Describe all contents to be included from the section	Chapter Title : Optical properties with matter,	
	Terminal Objectives : To understand the interaction of light to matter	
	Terminal Objectives ID : OPM-TO1	
	Classification : [ x ] understand concept [ x ] solve and operate [ x ] attitude change	
	Content descriptions of Terminal Objectives : Refraction of light using prism - Spectrum Phenomenon - Lens and focal point - Far-sighted vs short-sighted and remedial measures	
If the section contains more than one objective, they should be described separately	Terminal Objectives : .	
	Terminal Objectives ID :	
	Classification : [ ] understand concept [ ] solve and operate [ ] attitude change	
	Content descriptions of Terminal Objectives :	
	Terminal Objectives :	
	Terminal Objectives ID :	
	Classification : [ ] understand concept [ ] solve and operate [ ] attitude change	
	Content descriptions of Terminal Objectives :	
	Terminal Objectives :	
	Terminal Objectives ID :	
	Classification : [ ] understand concept [ ] solve and operate [ ] attitude change	
	Content descriptions of Terminal Objectives :	
Terminal Objectives :		
Terminal Objectives ID :		
Classification : [ ] understand concept [ ] solve and operate [ ] attitude change		
Content descriptions of Terminal Objectives :		

Check all items dealing with in the section

**Textbook Analysis Sheet (for Physics) Enabling Objectives**

Title : Enabling Objectives	Material ID : OPM	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objective: To understand the interaction of light with matter			Terminal Objective ID : OPM-TO1
Enabling Objectives ID :	Enabling Objectives/ Content Descriptions of Enabling Objectives :		Classification :
OPM-TO1-EO1	To understand the concepts and terminology in the Chapter		<input checked="" type="checkbox"/> Understand concept <input type="checkbox"/> solve and operate <input type="checkbox"/> attitude change
OPM-TO1-EO2	To calculate basic numerical problems		<input type="checkbox"/> Understand concept <input checked="" type="checkbox"/> solve and operate <input type="checkbox"/> attitude change
OPM-TO1-EO3	To recognize matter optically		<input type="checkbox"/> Understand concept <input checked="" type="checkbox"/> solve and operate <input type="checkbox"/> attitude change
			<input type="checkbox"/> Understand concept <input type="checkbox"/> solve and operate <input type="checkbox"/> attitude change
			<input type="checkbox"/> Understand concept <input type="checkbox"/> solve and operate <input type="checkbox"/> attitude change

Separately describe which contents and activities students are expected to undertake in the section.

Check how students alter their approach after attaining the objective.

Appendix 3-3

**Textbook Analysis Sheet (for Physics) Exercise and Quiz**

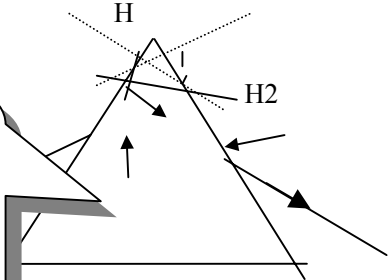
Title : Exercise and Quiz	Material ID : OPM	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objectives Title : To understand the interaction of light to matter			Terminal Objectives ID : OPM-S1-TO1
Enabling Objectives ID : OPM-S1-TO1/EO12			
Exercise ID : OPM-S1-TO1-EX1	Expected Time : 5 min.	Classification : <input checked="" type="checkbox"/> Practice <input type="checkbox"/> drill • review <input checked="" type="checkbox"/> test <input type="checkbox"/> supplementary test	
Exercise Title : Index of refraction of prism			
Classification <input type="checkbox"/> Interview <input type="checkbox"/> descriptive explanation <input checked="" type="checkbox"/> calculation <input type="checkbox"/> blank filling <input type="checkbox"/> multiple choice <input type="checkbox"/> matching <input type="checkbox"/> operational <input type="checkbox"/> others			
Related Material ID :		Difficulty <input type="checkbox"/> difficult <input type="checkbox"/> average <input checked="" type="checkbox"/> easy	
Exercise description : Calculate the index of refraction of prism, if angle of vertex=60, minimum angle of polarization =40		solution : $\angle A=60, \angle H=40$  $m_1 \times \sin (A+H)/2 = m_2 \times \sin (A/2)$ $1 \times \sin 50 = m_2 \times \sin 30$ $1 \times 0.766 = m_2 \times 0.500$ $m_2=1.532$ ---Ans.	
Describe all exercises, quizzes, drills and test items in the section and use a separate sheet for each item. You can describe summary or just write down here they are, such as P234 of textbook		Alternatively, state the reference of the solution, such as 'see page 233'.	
Instructional remarks :			

**Textbook Analysis Sheet (for Physics) Exercise and Quiz List**

Title : Exercise List	Material ID :	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objectives Title : To understand the interaction of light with matter			Terminal Objectives ID :
Exercise ID :	Exercise Title :		Classification :
OPM-S1-TO1-EX1	Index of refraction of prism		[x ] Practice [ ] drill • review [x ] test [ ] supplementary test
	(List Exercise & quiz as many as possible)		[ ] Practice [ ] drill • review [ ] test [ ] supplementary test
			[ ] Practice [ ] drill • review [ ] test [ ] supplementary test
			[ ] Practice [ ] drill • review [ ] test [ ] supplementary test
			[ ] Practice [ ] drill • review [ ] test [ ] supplementary test
			[ ] Practice [ ] drill • review [ ] test [ ] supplementary test
			[ ] Practice [ ] drill • review [ ] test [ ] supplementary test

Make a list from all sheets of **Exercise and Quiz**

**Textbook Analysis Sheet (for Physics) Teaching-learning Contents**

Title : Teaching-learning Contents	Material ID :	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objectives Title : To understand the interaction of light to matter			Terminal Objectives ID : OPM-S1-TO1
Enabling Objectives ID : OPM-S1-TO1/EO11			
T-L ID : OPM-S1-TO1-TL1	Expected time : 10 min.	Classification : [ ] example [x] rule/concept [ ] topic [ ] other	
T-L Title : Refraction of light in Prism			
T-L Classification [X] lecture [ ] experiment [X] observation [ ] discussion [ ] handout [ ] collaboration work [ ] exercise [ ] VCD etc			
Related Exercise ID :			
<p>Description of T-L Contents :</p> <p>When light is incident upon a prism, the light refracts on the face of the prism.</p> <p>As the light exits the prism, the light refracts on the opposite face.</p> <p>Therefore, the total deviation is shown: <math>H = H_1 + H_2</math></p> <p>The value of H is</p> <ul style="list-style-type: none"> <li>- angle of incidence,</li> <li>- wavelength of incident ray, index of refraction</li> </ul>		 <p>Instructional remarks etc :</p> <ul style="list-style-type: none"> <li>- Present how the trace of light refracts on and inside the prism.</li> <li>- Draw the figure of a prism and explain how the trace of light refracts on and inside the prism.</li> </ul> <p>Write difficulties of students during teaching and any instruction for effective and efficient teaching.</p>	

**Textbook Analysis Sheet (for Physics) : List of Teaching-learning Contents**

Title: : List of T-L Contents	Material ID : OPM	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objectives : To understand the interaction of light to matter		Terminal Objectives ID : OPM-S1-TO1	
Teaching-Learning ID :	T-L Title :	Style of Teaching-Learning	
OPM-S1-TO1-TL1	Refraction of light in Prism	<input checked="" type="checkbox"/> lecture <input type="checkbox"/> experiment <input checked="" type="checkbox"/> observation <input type="checkbox"/> discussion <input type="checkbox"/> handout <input type="checkbox"/> collaboration work <input type="checkbox"/> quiz & exercise <input type="checkbox"/> audio visual etc.	
		<input type="checkbox"/> lecture <input type="checkbox"/> experiment <input type="checkbox"/> observation <input type="checkbox"/> discussion <input type="checkbox"/> <input type="checkbox"/> handout <input type="checkbox"/> collaboration work <input type="checkbox"/> quiz & exercise <input type="checkbox"/> audio visual etc.	
		<input type="checkbox"/> lecture <input type="checkbox"/> experiment <input type="checkbox"/> observation <input type="checkbox"/> discussion <input type="checkbox"/> <input type="checkbox"/> handout <input type="checkbox"/> collaboration work <input type="checkbox"/> quiz & exercise <input type="checkbox"/> audio visual etc.	
		<input type="checkbox"/> lecture <input type="checkbox"/> experiment <input type="checkbox"/> observation <input type="checkbox"/> discussion <input type="checkbox"/> <input type="checkbox"/> handout <input type="checkbox"/> collaboration work <input type="checkbox"/> quiz & exercise <input type="checkbox"/> audio visual etc.	
		<input type="checkbox"/> lecture <input type="checkbox"/> experiment <input type="checkbox"/> observation <input type="checkbox"/> discussion <input type="checkbox"/> <input type="checkbox"/> handout <input type="checkbox"/> collaboration work <input type="checkbox"/> quiz & exercise <input type="checkbox"/> audio visual etc.	

Make a list from all sheets of **teaching**

**Textbook Analysis Sheet (for Physics) Concept/terminology (CT)**

Title: Concept/terminology	Material ID: OPM	Subject: Physics	Chapter title: Optical properties with matter.
Terminal Objectives title: Interaction of light with matter.			Terminal Objectives ID: OPM-S1-To1
Terminal Objectives ID: OPM-S1-To1-Eo4			
OPM-S1-To1-CT2	:	Classification: <input checked="" type="checkbox"/> concept/theory <input type="checkbox"/> terminology <input type="checkbox"/> Formula <input type="checkbox"/> Others	
Key word: Transmission.			
Key word: Transmission.			
Contents: Transmission is the motion of light (when incident on the interface between two media) from the first medium to the second medium.		Remarks: Text for reading and a simple exercise.	

Describe the meaning or contents of concept or terminology.

Appendix 3-8

**Textbook Analysis Sheet (for Physics) Concept/Terminology List**

Make a list from all Concept terminology sheets.

Title : CT List	Material ID : OPM	Subject : Physics	Chapter Title : Optical properties with matter
Terminal Objectives Title : To explain the interaction of light to matter		Terminal Objective ID : OPM – S1-TO1	
CT ID :	CT Title :	Classification :	
OPM-S1-To1-CT1	Reflection.	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT2	Transmission	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT3	Absorption	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT4	Diffuse reflection	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT5	Specular reflection	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT6	Reflection coefficient.	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	
OPM-S1-To1-CT7	Law of reflection	[x ] concept/theory [ ] terminology [x ] Formula [ ] Others	
OPM-S1-To1-CT8	Transmission coefficient	[x ] concept/theory [ ] terminology [ ] Formula [ ] Others	



## Appendix 4: Design Form

### 1. Specification of Course

Title: : Specification of Course	Instruction Hours :
Physics in Grade 11	
Course title ( Lesson title):	
Course ID( Lesson ID):	
Overview of Course:	
Overview of Teaching method:	
Target learners ( needed skills)	
Method of providing (media) & developing tool and software	

## 2. Infrastructure

Sheet name: Infrastructure (1)	PC & Server
Project name:	
School environment:	
Network(the Internet & intranet):	
[the Internet]	
Server spec:	
[Hardware]	
[Software]	
Teacher's and student's PC spec:	
[Hardware]	
[Software]	

Infrastructure (2)

Sheet name: Infrastructure (2)	Internet Layout
Project name:	

Infrastructure (3)

Sheet name: Infrastructure (3)	PC class room
Project name:	

3. Lesson List kSheet Name: Lesson List	Chapter title: Optical Properties of Matter	Chapter ID OPM		
Lesson ID:	Course title (Lesson title):	Time	Media	Method/Comment
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	
			<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	

#### 4. Common Layout

Title: : Common Layout	Course title:	Course ID:Phy11(Sample)

5. Framework & Cluster

Title: : Framework& Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level:[ ]Course, [ ]Chapter, [ ]Lesson	Chapter title:	Chapter ID:
Level:[ ]Part	Lesson title:	Lesson ID:
No: 1	Part title:	

6. Glossary Define Sheet

Title: : Glossary	Course ID:	Glossary	
Term:			
Summary:		Lesson:	
Detail:		Keyword:	
		Property:	



### 7. Specification of Lesson

Title : Specification of Course	Instruction Hours :	
Physics in Grade 11		
Lesson title:		
Lesson ID:		
Overview of Lesson:		
Overview of Object:		
Overview of Teaching method:		
Pages		
Screen		
Graphic		
Picture		
Movie		
Animation		
Simple Simulation		
Complex Simulation		
Voice		
Music		
Question		
Glossary (term)		

8. Lesson plan

Title : Lesson plan		Chapter title:		Chapter ID:	
Lesson title:			Lesson ID:		Instruction Hours :
Time	Pages	Main (Screen)	Objects	Action	

9. Screen Design Sheet

Title: : Screen	Lesson ID:	Screen & Media ID:
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
		Related material: Time line ID: Narration ID:
		Interaction: Back: Next: Anther:
		Simple time line
		Comment

10. Storyboard

Title: : story board	Upper ID:
Define [ ]screen [ ]animation [ ]question	Storyboard ID :
Screen summary	Display, move, narration
<div style="border: 1px solid black; width: 80%; height: 80%; margin: auto;"></div>	
<div style="border: 1px solid black; width: 80%; height: 80%; margin: auto;"></div>	
<div style="border: 1px solid black; width: 80%; height: 80%; margin: auto;"></div>	
<div style="border: 1px solid black; width: 80%; height: 80%; margin: auto;"></div>	
<div style="border: 1px solid black; width: 80%; height: 80%; margin: auto;"></div>	

11. Define Question

Title: : Q. define	Upper ID:
Define question	ID :
Correct answer	
Evaluate [bottom]	
[Hint] bottom	
Comment	

12. Detail design Sheet (for Physics)

Narration ID:	
Narration ID:	
Narration ID:	

13. Time Line

Title: : Time Line	Upper ID:
Define [ ]screen [ ]animation [ ]question	Time line ID :
	Display, move, narration

## **Appendix 5: Design Form Sample**

### Specification of Course

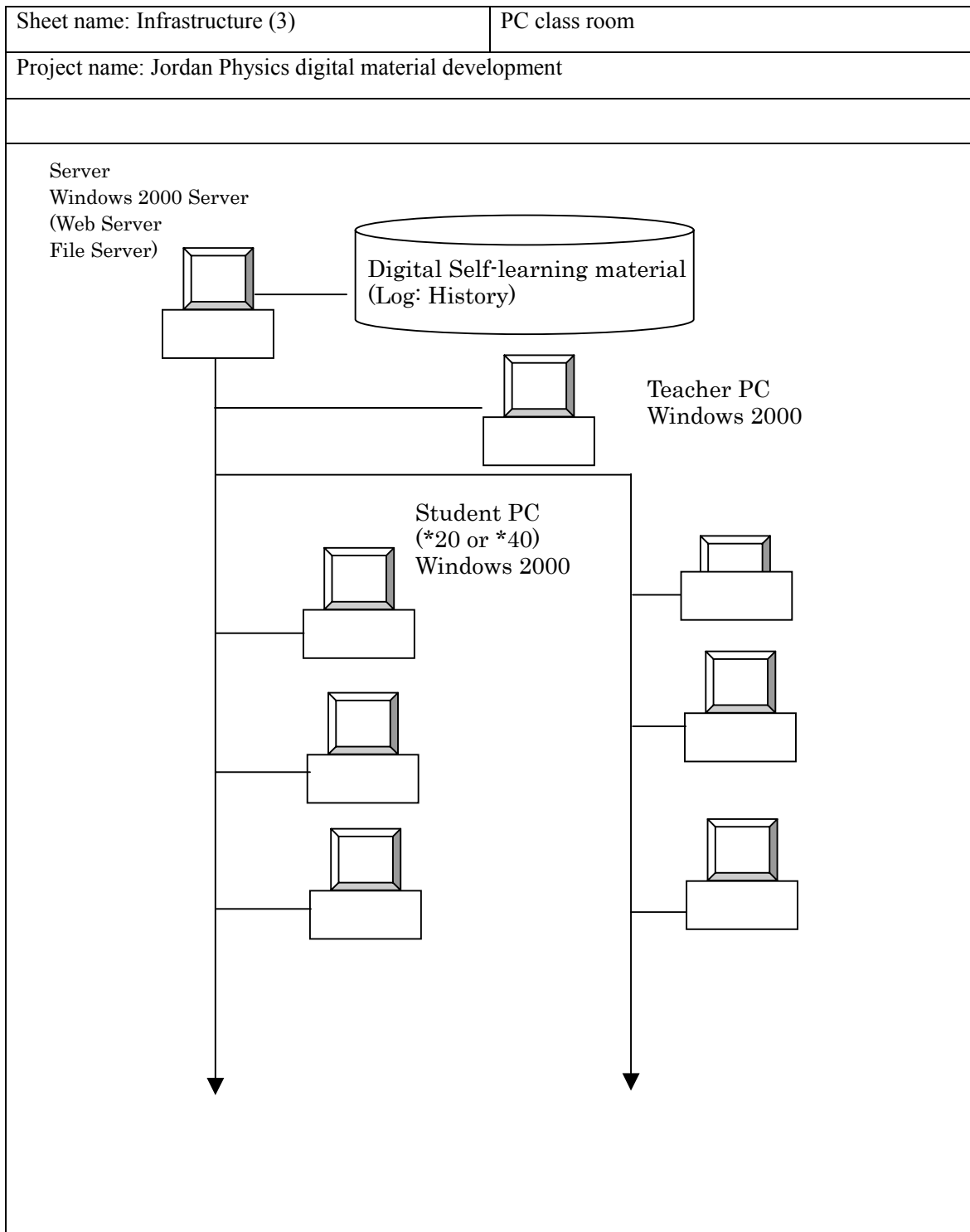
Title : Specification of Course	Instruction Hours :
Physics in Grade 11	12 + 12 School Lesson hours
Course title (Lesson title): Physics in Grade 11	
Course ID(Lesson ID):PhyG11	
Overview of Course:	
<p>This Digital self-learning material includes 2 chapters of physics in grade 11.</p> <p>Chapter 9 Optical Properties of Matter (ID: OPM)</p> <p>Chapter 10 Oscillatory Motion &amp; Wave (ID: OPM)</p> <p>Each Chapter has 12 Lessons.</p> <p>2-language version (in Arabic and in English.)</p>	
Overview of Teaching method:	
<p>Self – learning with</p> <p>Digital material</p> <p>Real experiment</p> <p>Electric collaboration (like BBS)</p> <p>Teachers support and enhance students in classroom.</p>	
Target learners (needed skills)	
<p>Grade 11 students</p> <p>Needed computer skills:</p> <p>Basic operation (Key board, mouse, Arabic and English Type)</p> <p>Browsing, BBS</p>	
Method of providing (media) & developing tool and software	
<p>Digital material is executed in Windows OS &amp; Browser (IE).</p> <p>Digital material is contained in Web server or File server of Classroom Windows server and CD-ROM.</p> <p>(It is possible to collect data in Web server)</p> <p>Developing language (Developing tool and software)</p> <p>HTML, Flash5</p> <p>Java (Java Script, Java applet)</p> <p>(CGI (Perl, etc) or ASP (VBScript or JavaScript) for server programming)</p>	



### Infrastructure

Sheet name: Infrastructure (1)	PC & Server
Project name: Jordan Physics digital material development	
School environment:	
Network (the Internet & intranet):	
<p>[The Internet] Through Jordan Ministry of Education Intranet</p> <p>[Intranet] Windows NT2000Server and 100M Pc room intranet Teacher's PC *1, Student's PC * 20 or 40 in the PC room.</p>	
Server spec:	
<p>[Hardware] CPU: Intel P3 Xeon 933Mhz, Memory 256MB, HDD 36GB Monitor: 15", Backup Device: Tape DAT,</p> <p>[Software] Microsoft BackOffice Including Windows 2000 Server</p>	
Teacher's and student's PC spec:	
<p>[Hardware] CPU: Intel P3 833Mhz, Memory 256MB, HDD 40GB VGA: I815E on board, Audio: AC'97 compliant CD: DVD&amp; CD combo Monitor: 15" 800* 600 (1024*768)</p> <p>[Software] OS: Windows XP Professional APP: MS-Office XP, Encarta 2001</p>	

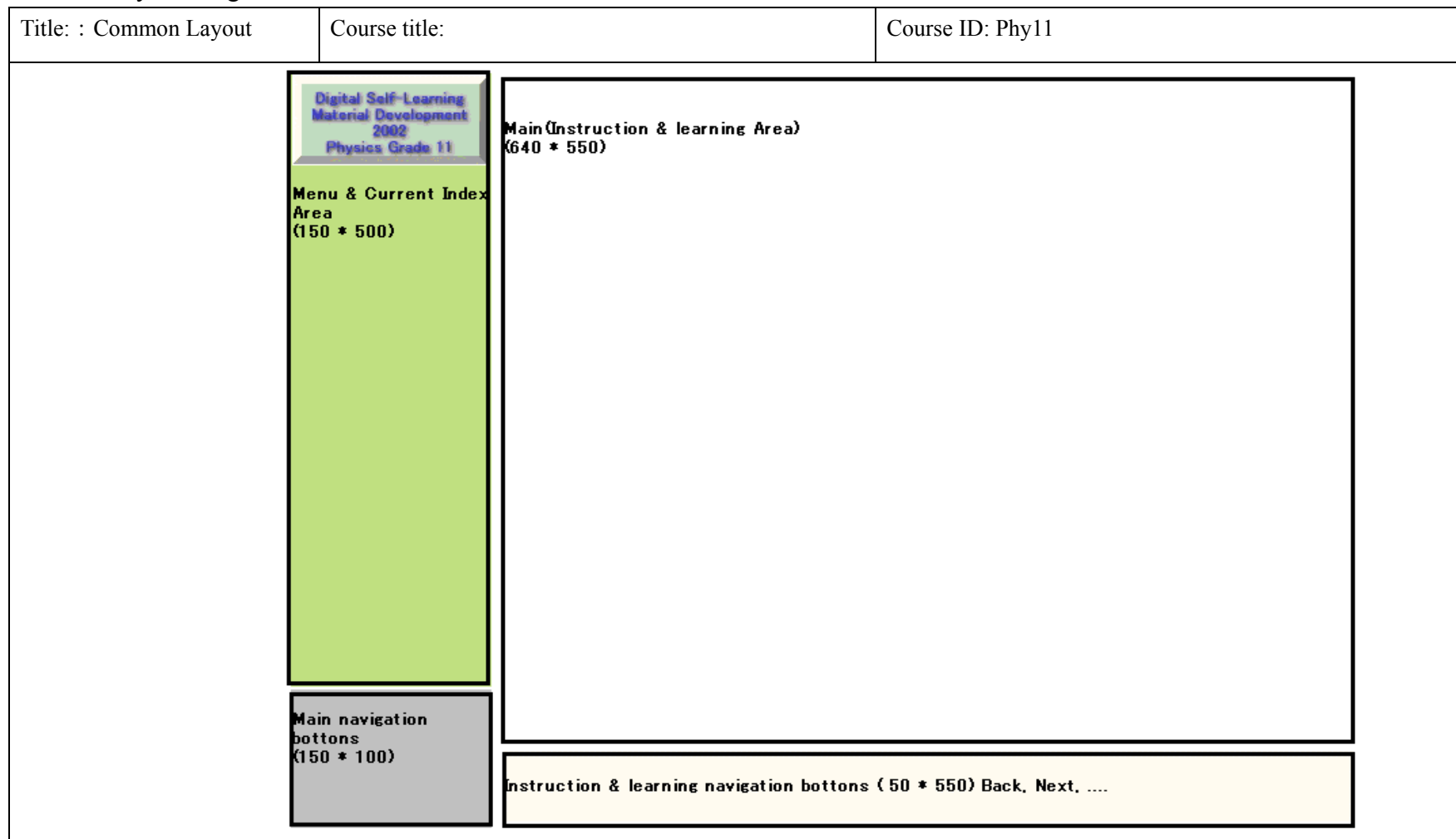
Infrastructure (3)



## Lesson List

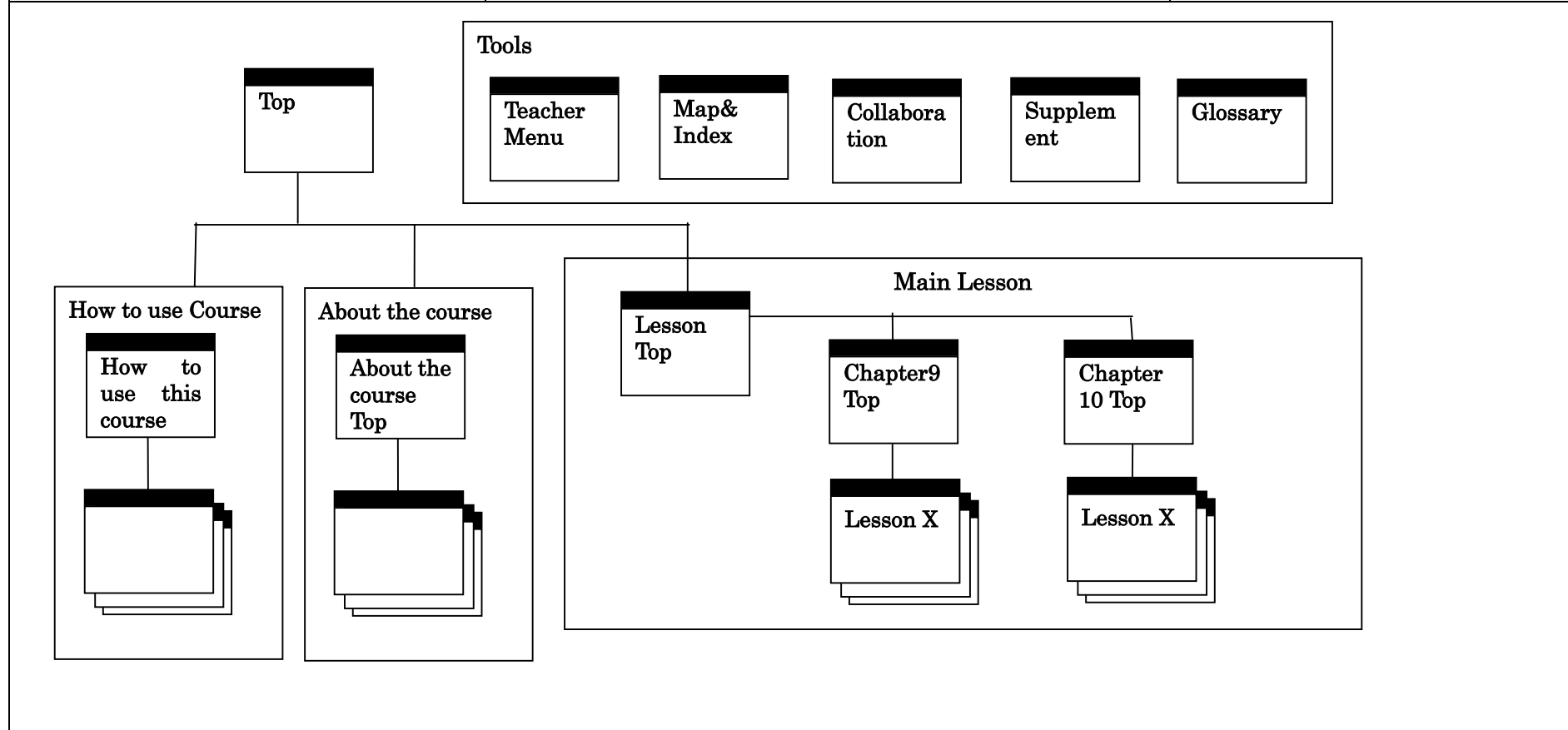
Sheet Name: Lesson List	Chapter title: Optical Properties of Matter	Chapter ID OPM		
Lesson ID:	Course title (Lesson title):	Time	Media	Method/Comment
OPM-L1	Reflection Absorption of light	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Voice drilling review animation- (simple tutorial)
OPM-L2	Transmission of light	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Simple experiment- Voice - Text
OPM- L3	Refraction of light	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Voice - Movie
OPM – L4	Angle of Minimum Deviation	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Media Simulation
OPM – L5	Refraction of spherical surface	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Animation Movie
OPM – L6	Type of lenses	45	<input type="checkbox"/> CD-ROM <input type="checkbox"/> WBT-LAN <input type="checkbox"/> WBT-Internet	Picture – Movie graph

Common Layout: English version



Top level cluster

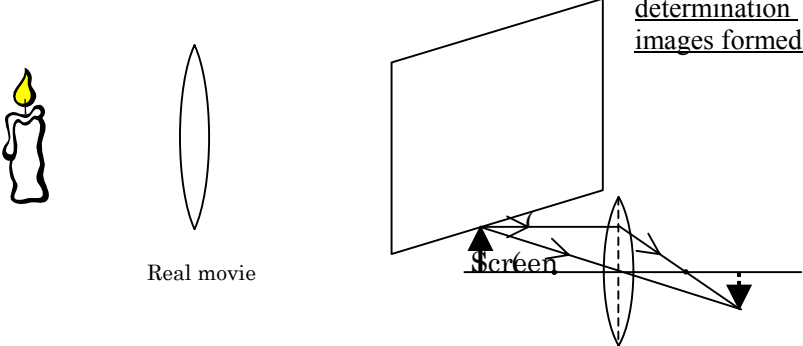
Title: : Framework& Cluster	Course Name :Physics Grade 11	Course ID: PhyG11
Level:[x ]Course, [ ]Chapter, [ ]Lesson	Chapter title:	Chapter ID:
No :1	Lesson title:	Lesson ID:



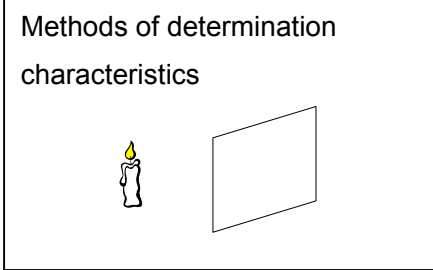
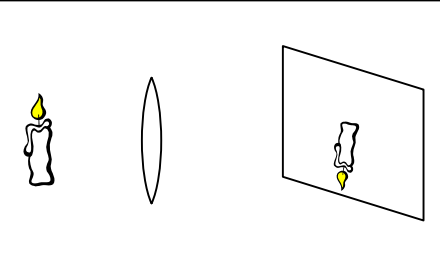
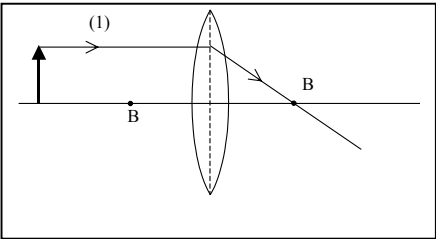
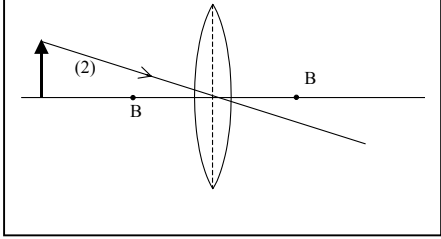
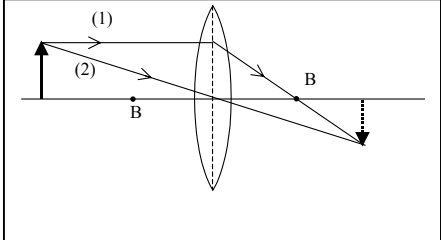
### Specification of Lesson

Title : Specification of lesson		Instruction Hours : 45min
Physics in Grade 11		
Lesson title: Reflection and absorption of light		
Lesson ID: OPM-L1		
Overview of Lesson:		
<ul style="list-style-type: none"> <li>• Interaction of light with matter</li> <li>• Properties of light</li> <li>• Refraction</li> </ul>		
Overview of Object:		
OPM-S1-TO1: Define the following concepts, reflection transmission, absorption, uniform reflection, incident angle, reflected angle, some experiments about reflection.		
Overview of Teaching method:		
<ul style="list-style-type: none"> <li>• Tutorial</li> </ul> <p>Explanation (text, movie, animation, voice)</p> <p>Question.</p>		
Pages	8	
Screen	13	
Graphic	8	
Picture	3	
Movie	2	
Animation	3	
Simple Simulation	2	
Complex Simulation	3	
Voice	8	
Music	8	
Question	4	
Glossary (term)	6	

Screen Design Sheet

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S020 (a)
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input checked="" type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><u>Methods of characteristics of in lenses:</u></p>  <p>Real movie</p> <p><u>determination images formed</u></p> <p>How does an image of an object form in a lens? The formulation of images can be illustrated in two ways: 1. Geometrical Method: a. <u>Convex lens:</u></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The ray which is incident parallel to the principal axis is refracted off the principal plane in such a way that it passes through the focal point.</li> <li><input type="checkbox"/> The ray passing through the lens' optical centre does not suffer any refraction.</li> <li><input type="checkbox"/> The point of intersection of the two refracted rays (1) and (2) represents the tip of the image.</li> </ul>	<p>Related material: Time line ID: OPM-L8-S020-T01 Narration ID: S020-V01</p>	
<p>Interaction: Back: Part (1) Next: Part (3) Anther:</p>		
		Simple time line
		Comment

Storyboard

Title: story board	Upper ID: OPM-L8-S02 / a
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S030-A01
Screen summary	Display, move, narration
	<p>Appearance of the title followed by the appearance of a candle in front of a screen.</p>
	<p>Then a convex lens is inserted between the candle and the screen. The image of the candle forms on the screen, followed by the question:          “How did the image of the candle form on the screen?”</p>
	<p>How does an image of an object form in a lens?  <u>Convex lens:</u>          According to the given description the image is formed in the lens and is synchronized with the incidence of rays and the way each is refracted. This rays appear one by one.</p>
	
	<p>Upon completion of the appearance of incident and refracted rays, the resulting image is drawn in a semi-transparent colour.</p>



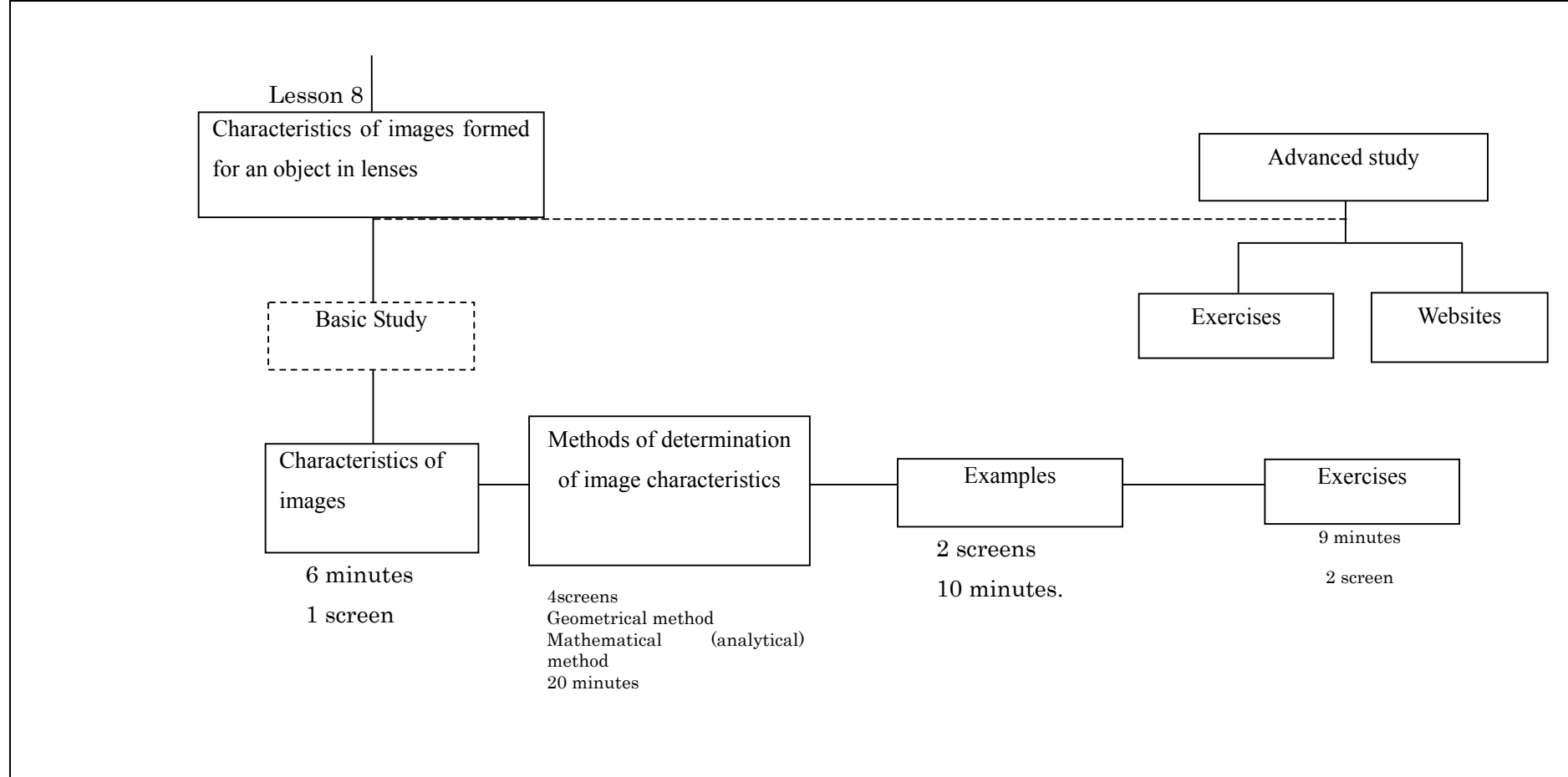
Detail design Sheet (for Physics)

Narration ID: S020-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> Real movie to demonstrate the formation of the image on a screen for an object placed in front of a lens.</li><li><input type="checkbox"/> Convex lens: The text is to be read, accompanied by the incidence of light rays one by one + flash.</li><li><input type="checkbox"/> Concave lens: The text is to be read, accompanied by the incidence of light rays one by one + flash.</li></ul>	
Narration ID:	
Narration ID:	

## **Appendix 6: Design Sample (Lesson 8)**

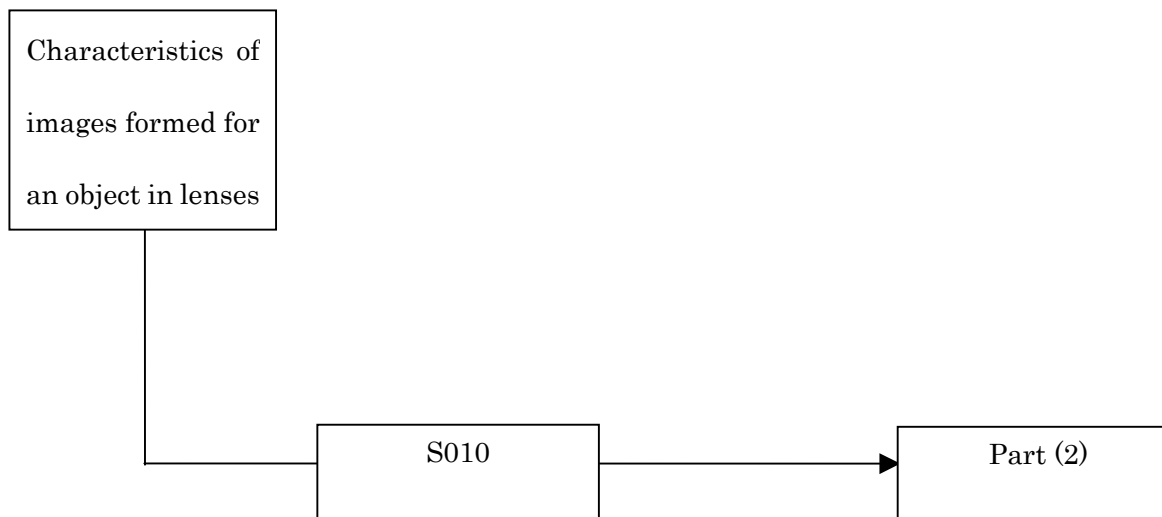
Basic design Sheet (for Physics) Framework & Cluster

Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [ ]Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8



Basic design Sheet (for Physics) Framework & Cluster

Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [X] Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
Level: [X] Part	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8
No: 1	Part title: Characteristics of images.	



Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S010
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><b>Characteristics of images formed in lenses:</b>                  An image formed for an object placed in front of a lens is characterized by three characteristics, so that one characteristic is taken from each of the groups 1, 2, 3 at a time:</p> <ol style="list-style-type: none"> <li>1. <input type="checkbox"/> Magnified, <input type="checkbox"/> reduced in size, or <input type="checkbox"/> equal in size.</li> <li>2. <input type="checkbox"/> Erect or <input type="checkbox"/> inverted.</li> <li>3. <input type="checkbox"/> Real or <input type="checkbox"/> virtual.</li> </ol>		<p>Related material:                  Time line ID: OPM-L8-S01-T01                  Narration ID: S01-V01</p> <hr/> <p>Interaction:                  Back: _____                  Next: Part (2)                  Anther:</p> <hr/> <p>Simple time line</p> <hr/> <p>Comment</p>

Detail design sheet (for Physics) Storyboard

Title: story board		Upper ID: OPM-L8-S010
Define <input checked="" type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question		Storyboard ID: S010-A01
	Screen summary	Display, move, narration
	<div style="border: 1px solid black; padding: 5px; margin: 5px;"> <p><u>Characteristics of images formed in lenses:</u></p> </div>	Appearance of the text.
	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	
	<div style="border: 1px solid black; height: 100px; width: 100%;"></div>	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S01
Define [x ] screen [ ]animation [ ]question	Time line ID: OPM-L8-S01-T01
	Display, move, narration
	<ul style="list-style-type: none"><li>□ 4 minutes.</li></ul>

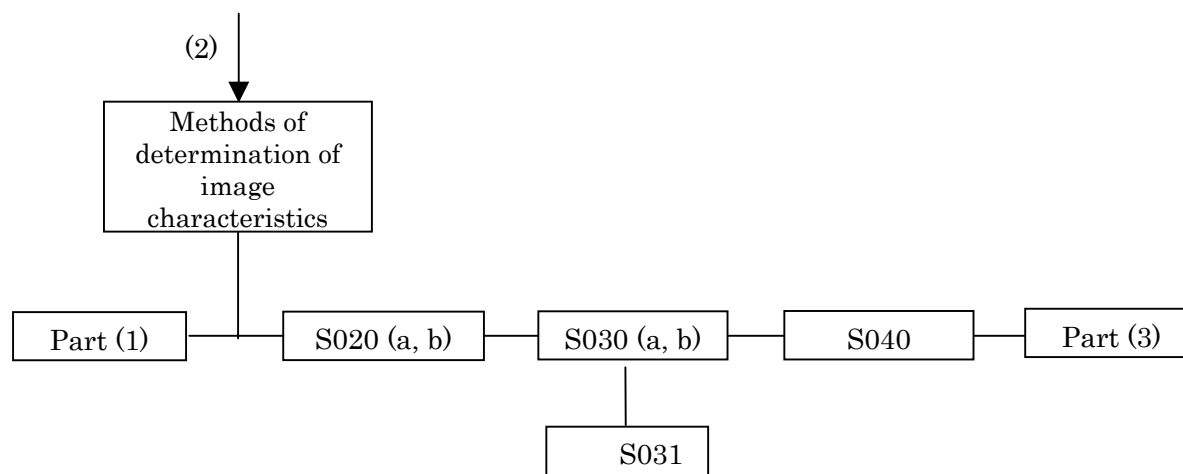
Detail design Sheet (for Physics)

Narration ID: S01-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> Voice + soft music.</li></ul>	
Narration ID:	
Narration ID:	

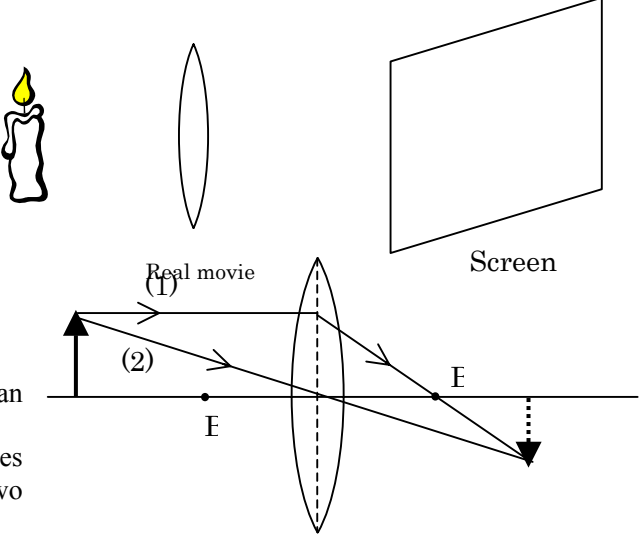


Basic design Sheet (for Physics) Framework & Cluster

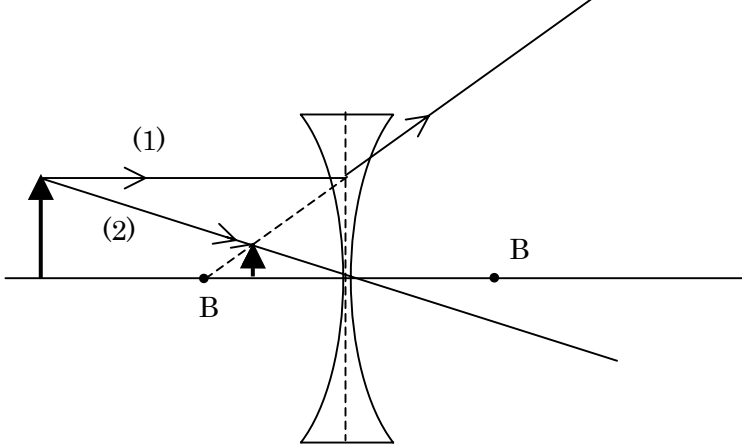
Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [ ]Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
Level: [X] Part	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8
No: 2	Part title: Methods of determination of image characteristics	



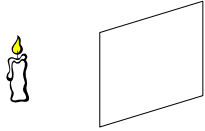
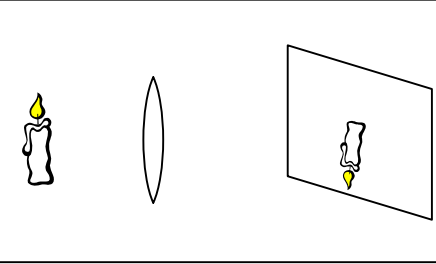
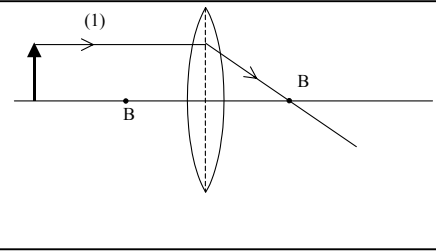
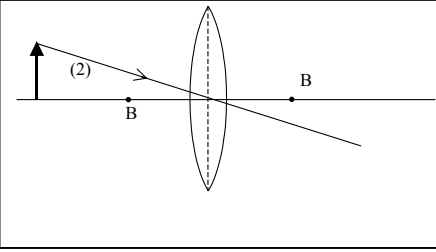
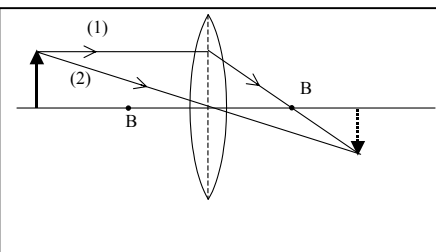
Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S020 (a)
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input checked="" type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><u>Methods of determination characteristics of images formed in lenses:</u></p> <p>How does an image of an object form in a lens? The formulation of images can be illustrated in two ways:</p> <p>1. Geometrical Method:</p> <p>b. <u>Convex lens:</u></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The ray which is incident parallel to the principal axis is refracted off the principal plane in such a way that it passes through the focal point.</li> <li><input type="checkbox"/> The ray passing through the lens' optical centre does not suffer any refraction.</li> <li><input type="checkbox"/> The point of intersection of the two refracted rays (1) and (2) represents the tip of the image.</li> </ul>	 <p>Real movie</p> <p>Screen</p> <p>F</p> <p>F</p>	<p>Related material: Time line ID: OPM-L8-S020-T01 Narration ID: S020-V01</p> <p>Interaction: Back: Part (1) Next: Part (3) Anther:</p> <p>Simple time line</p> <p>Comment</p>

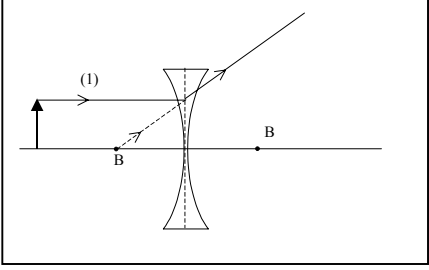
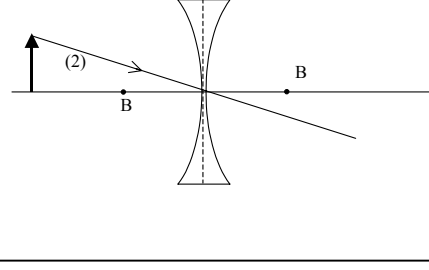
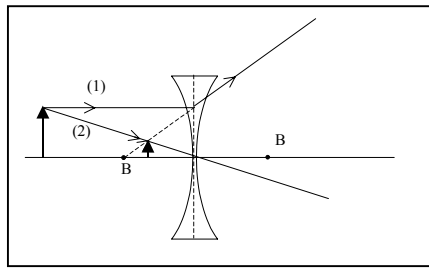
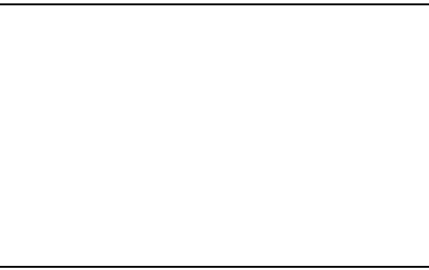
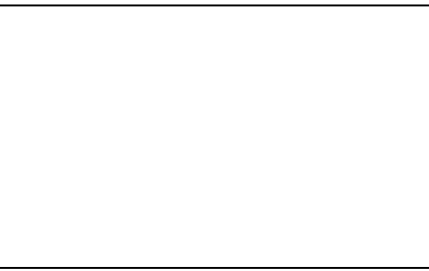
Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S020 (b)
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input checked="" type="checkbox"/> Animation <input type="checkbox"/> movie		
<p>c. <u>Concave lens:</u></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> The ray which is incident parallel to the principal axis is refracted off the principal plane in such a way that its extension passes through the focal point, and hence the focal point of a concave lens is taken to be virtual (<math>f</math> is negative).</li> <li><input type="checkbox"/> The ray passing through the lens' optical centre is transmitted without refraction.</li> <li><input type="checkbox"/> The point of intersection of the two refracted rays (1) and (2) represents the tip of the</li> </ul>	<p>Related material:</p> <p>Time line ID: OPM-L8-S020-T01</p> <p>Narration ID: S020-V01</p>	
	<p>Interaction:</p> <p>Back: Part (1)</p> <p>Next: Part (3)</p> <p>Anther:</p>	
<p>image.</p>	<p>Simple time line</p> <p>Comment</p>	

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S02 / a
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S030-A01
Screen summary	Display, move, narration
<div data-bbox="256 414 694 689"> <p>Methods of determination characteristics...</p>  </div>	<p>Appearance of the title followed by the appearance of a candle in front of a screen.</p>
<div data-bbox="252 763 708 1025">  </div>	<p>Then a convex lens is inserted between the candle and the screen. The image of the candle forms on the screen, followed by the question: "How did the image of the candle form on the screen?"</p>
<div data-bbox="252 1111 708 1361">  </div>	<p>How does an image of an object form in a lens? <u>Convex lens:</u> According to the given description the image is formed in the lens and is synchronized with the incidence of rays and the way each is refracted. This rays appear one by one.</p>
<div data-bbox="252 1413 708 1664">  </div>	
<div data-bbox="252 1704 708 1955">  </div>	<p>Upon completion of the appearance of incident and refracted rays, the resulting image is drawn in a semi-transparent colour.</p>

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S020 / b
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S020-A01
Screen summary	Display, move, narration
	<p><u>Concave lens:</u>                  The concave lens appears in the frame, and the corresponding steps as in the convex lens are made.</p>
	
	
	
	

Detail design Sheet (for Physics)

Narration ID: S020-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> Real movie to demonstrate the formation of the image on a screen for an object placed in front of a lens.</li><li><input type="checkbox"/> Convex lens: The text is to be read, accompanied by the incidence of light rays one by one + flash.</li><li><input type="checkbox"/> Concave lens: The text is to be read, accompanied by the incidence of light rays one by one + flash.</li></ul>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S020
Define [X] screen [ ]animation [ ]question	Time line ID: OPM-L8-S020-T01
	Display, move, narration
	<ul style="list-style-type: none"><li>❑ 2 minutes for the movie.</li><li>❑ The text + incidence of rays for both convex and concave lasting 4 minutes.</li></ul>

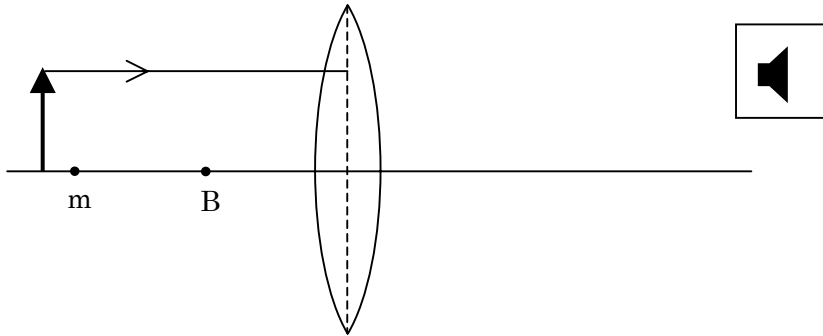
Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S030 (a)
---------------	-------------------	-----------------------------

Define  Screen  Graphic ID  Simulation  Animation  movie

2. The mathematical method:

a. The convex lens:



Simulation + Dragging

Distance of image

$i$

Distance of object

$o$

Focal length

$f = 10 \text{ cm}$

Related material:

Time line ID: OPM-L8-S030-T01

Narration ID: S030-V01

Interaction:

Back: Part (1)

Next: Part (3)

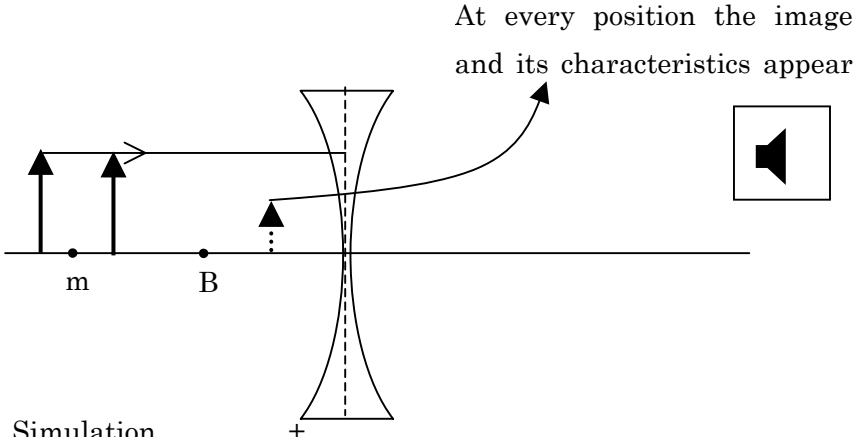
Anther: Buttons (film).

Simple time line

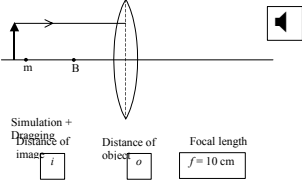
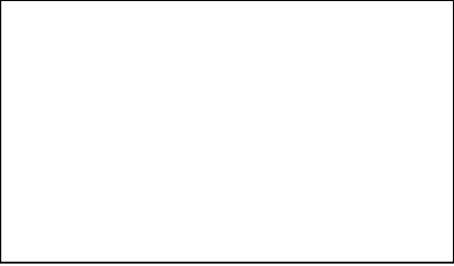
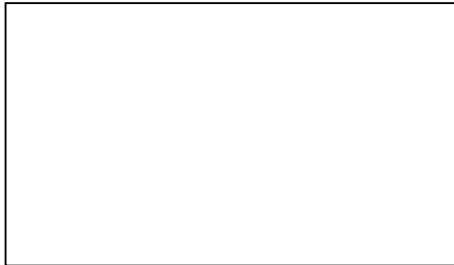


Comment



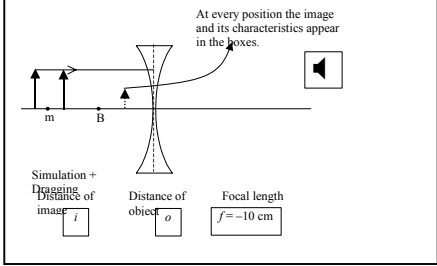
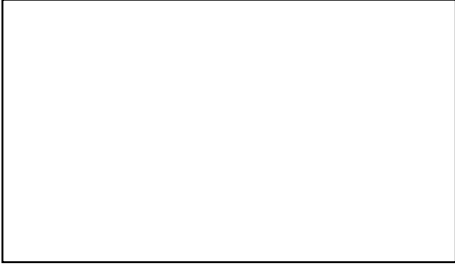
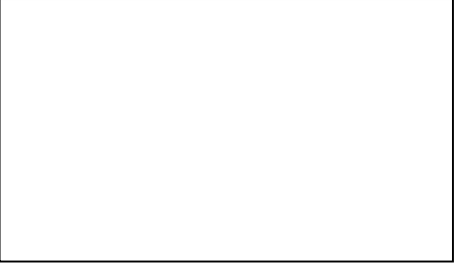
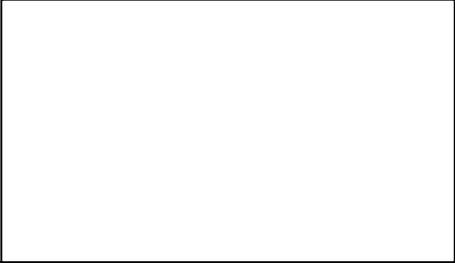

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S030 (a)
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input checked="" type="checkbox"/> Animation <input type="checkbox"/> movie		
<p>b. The concave lens:</p>  <p>Simulation</p> <p>Distance of image <input type="text" value="i"/></p> <p>Distance of object <input type="text" value="o"/></p> <p>Focal length <input type="text" value="f = -10 cm"/></p>	<p>Related material:</p> <p>Time line ID: OPM-L8-S030-T01</p> <p>Narration ID: S030-V01</p>	
<p>Interaction:</p> <p>Back: Part (1)</p> <p>Next: Part (3)</p> <p>Anther: Buttons (related to a film).</p>		
<p>Simple time line</p>		
<p>Comment</p>		

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S03 / a
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S03-A01
Screen summary	Display, move, narration
<div data-bbox="236 461 692 725"> <p>The mathematical method...</p>  <p>Simulation + Distance of image <math>i</math> Distance of object <math>o</math> Focal length <math>f = 10 \text{ cm}</math></p> </div>	<p>The mathematical method: The convex lens.</p> <p>The title appears, followed by a convex lens and a moveable object. During that, the graphical relation between (<math>i</math>, <math>o</math>), and a button linking with (S031) and showing a real movie.</p>
<div data-bbox="236 788 692 1052">  </div>	
<div data-bbox="236 1111 692 1375">  </div>	
<div data-bbox="236 1433 692 1697">  </div>	
<div data-bbox="236 1756 692 2020">  </div>	

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S03 / b
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S03-A0
Screen summary	Display, move, narration
	<p>The mathematical method: The concave lens; as in the convex lens.</p>
	
	
	
	

Detail design Sheet (for Physics)

Narration ID: S030-V01	
<p>For the concave lens: Appearance of the title followed by narration then the graphical relation.</p> <p>For the convex lens: Appearance of the title followed by narration then the graphical relation.</p>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S030
Define <input checked="" type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Time line ID: OPM-L8-S030-T01
	Display, move, narration
	<ul style="list-style-type: none"><li><input type="checkbox"/> 4 minutes for the convex lens.</li><li><input type="checkbox"/> 4 minutes for the concave lens.</li></ul>

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S031
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input checked="" type="checkbox"/> movie		
<ul style="list-style-type: none"> <li><input type="checkbox"/> A movie demonstrating the nature of images formed in concave lenses.</li> <li><input type="checkbox"/> A movie demonstrating the nature of images formed in convex lenses.</li> </ul>	Related material: Time line ID: OPM-L8-S031-T01 Narration ID: S031-V01	
	Interaction: Back: S030 Next: _____ Anther:	
	Simple time line	
	Comment	

Detail design Sheet (for Physics)

Narration ID: S031-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> A movie demonstrating the nature of images formed in concave lenses.</li><li><input type="checkbox"/> A movie demonstrating the nature of images formed in convex lenses.</li></ul>	
Narration ID:	
Narration ID:	

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S040																				
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie																						
<p><u>Summary:</u></p> <p>1. The equation of lenses:</p> $\frac{1}{o} + \frac{1}{i} = \frac{1}{f}$ <p><math>o</math> : Distance of object, <math>i</math> : Distance of image, <math>f</math> : Focal length.</p> <p>2. Magnification <math>= \frac{i}{o} = \frac{l_i}{l_o} = M</math>, <math>l_i</math> is the length of the image and <math>l_o</math> that of the object.</p> <p>3. A table showing the signs of <math>i, o, f</math> and their meanings:</p> <table border="1" data-bbox="212 853 974 997"> <thead> <tr> <th>Lens</th> <th>Sign of (<math>f</math>)</th> <th>Sign of (<math>o</math>)</th> <th>Sign of (<math>i</math>)</th> </tr> </thead> <tbody> <tr> <td>Convex</td> <td>+</td> <td>+</td> <td>+ *</td> </tr> <tr> <td>Concave</td> <td>-</td> <td>+</td> <td>-</td> </tr> </tbody> </table> <p>* i(-) Signs if (<math>o &lt; f</math>)</p> <p>4. A table showing the sign of magnification and its meaning:</p> <table border="1" data-bbox="212 1093 817 1292"> <thead> <tr> <th rowspan="2">Image \ Object</th> <th>Real (+)</th> <th>Virtual (-)</th> </tr> </thead> <tbody> <tr> <th>Real (+)</th> <td>+</td> <td>-</td> </tr> <tr> <th>Virtual (-)</th> <td>-</td> <td>+</td> </tr> </tbody> </table>	Lens	Sign of ( $f$ )	Sign of ( $o$ )	Sign of ( $i$ )	Convex	+	+	+ *	Concave	-	+	-	Image \ Object	Real (+)	Virtual (-)	Real (+)	+	-	Virtual (-)	-	+	<p>Related material:</p> <p>Time line ID: OPM-L8-S040-T01</p> <p>Narration ID: S040-V01</p> <p>Interaction:</p> <p>Back: Part (1)</p> <p>Next: Part (3)</p> <p>Anther:</p> <p>Simple time line</p> <p>Comment</p>
Lens	Sign of ( $f$ )	Sign of ( $o$ )	Sign of ( $i$ )																			
Convex	+	+	+ *																			
Concave	-	+	-																			
Image \ Object	Real (+)	Virtual (-)																				
	Real (+)	+	-																			
Virtual (-)	-	+																				

Print



Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S02
Define [ ]screen [ ]animation [ ]question	Storyboard ID: S04
	Screen summary
	<div data-bbox="264 416 721 678" style="border: 1px solid black; padding: 5px;"> <p><u>Summary:</u></p> </div> <div data-bbox="751 409 1442 477" style="padding: 5px;"> <p>Gradual appearance of the text, at the end of which a button appears for printing in coordination with MsO2000.</p> </div>
	<div data-bbox="264 763 721 1025" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="264 1111 721 1373" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="264 1424 721 1686" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="264 1733 721 1995" style="border: 1px solid black; height: 117px;"></div>

Detail design Sheet (for Physics)

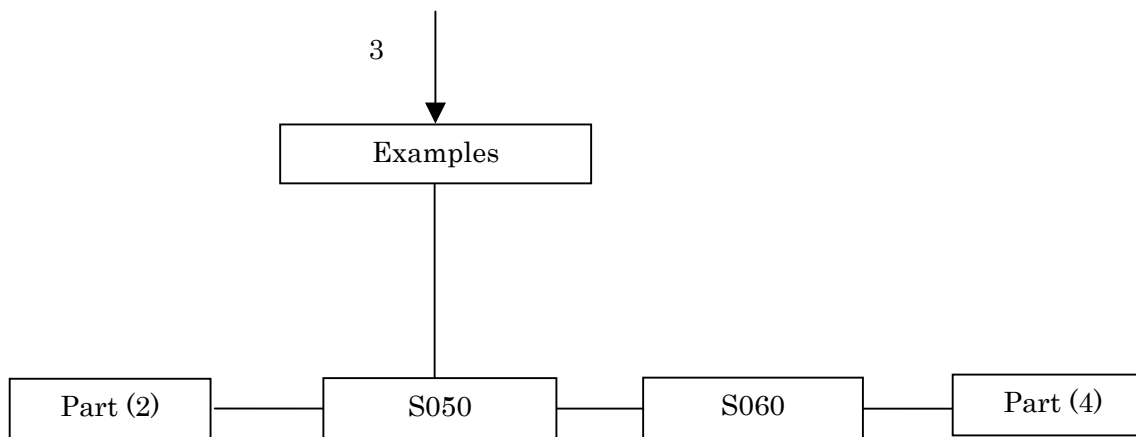
Narration ID: S040-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> A text to be read.</li><li><input type="checkbox"/> A button appears for printing in coordination with MsO2000.</li></ul>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S040
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Time line ID: OPM-L8-S040-T01
Display, move, narration	
<ul style="list-style-type: none"><li><input type="checkbox"/> The summary: 6 minutes.</li></ul>	

Basic design Sheet (for Physics) Framework & Cluster

Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [ ]Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
Level: [X] Part	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8
No: 3	Part title: Examples.	



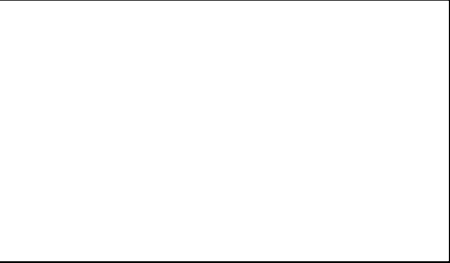
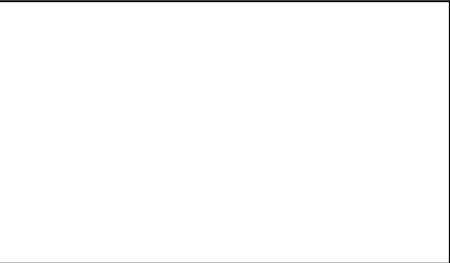
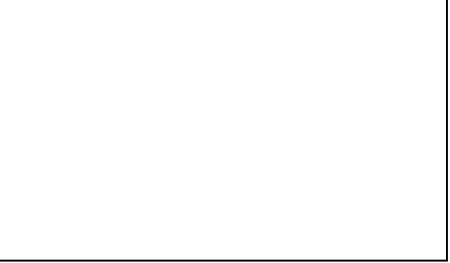
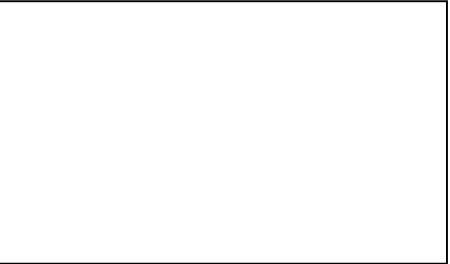
Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S050	
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie			
<p><u>Examples:</u></p> <p><u>Example (1):</u></p> <p>Example (9-7) on page <u>180</u> of the textbook.</p>		<p>Related material:</p> <p>Time line ID: OPM-L8-S050-T01</p> <p>Narration ID: S050-V01</p>	
		<p>Interaction:</p> <p>Back: Part (2)</p> <p>Next: Part (4)</p> <p>Anther:</p>	
		Simple time line	
		Comment	

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S060	
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie			
<p><u>Example (2):</u></p> <p>Example (9-8) on pages <u>180-181</u> of the textbook.</p>		<p>Related material:</p> <p>Time line ID: OPM-L8-S060-T01</p> <p>Narration ID: S060-V01</p>	
		<p>Interaction:</p> <p>Back: Part (2)</p> <p>Next: Part (4)</p> <p>Anther:</p>	
		Simple time line	
		Comment	

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S05
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Storyboard ID: S05-A01
	Screen summary
	<p>Display, move, narration</p> <p>Example (9-7) on page <u>180</u> of the textbook, followed by its solution.</p>
	
	
	
	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S050-T01
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input checked="" type="checkbox"/> question	Time line ID: OPM-L8-S050-T01
	Display, move, narration
	<ul style="list-style-type: none"><li><input type="checkbox"/> 5 minutes.</li></ul>



Detail design Sheet (for Physics)

Narration ID: S050-V01	
<input type="checkbox"/> Soft music.	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: story board		Upper ID: OPM-L8-S060
Define <input checked="" type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question		Storyboard ID: S06-A0
	Screen summary	Display, move, narration
	<div style="border: 1px solid black; padding: 10px; min-height: 100px;"> <p><u>Example:</u> ....</p> </div>	Exercises: The text of exercise 11 on page 191 from the textbook appears.
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	

Detail design sheet (for Physics) Storyboard

Title: story board		Upper ID: OPM-L8-S060
Define <input checked="" type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question		Storyboard ID: S06-A01
	Screen summary	Display, move, narration
	<div style="border: 1px solid black; padding: 10px; min-height: 100px;"> <p><u>Examples:</u> ....</p> </div>	Example (9-8) on page 180 of the textbook.
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	
	<div style="border: 1px solid black; min-height: 100px;"></div>	

Detail design Sheet (for Physics)

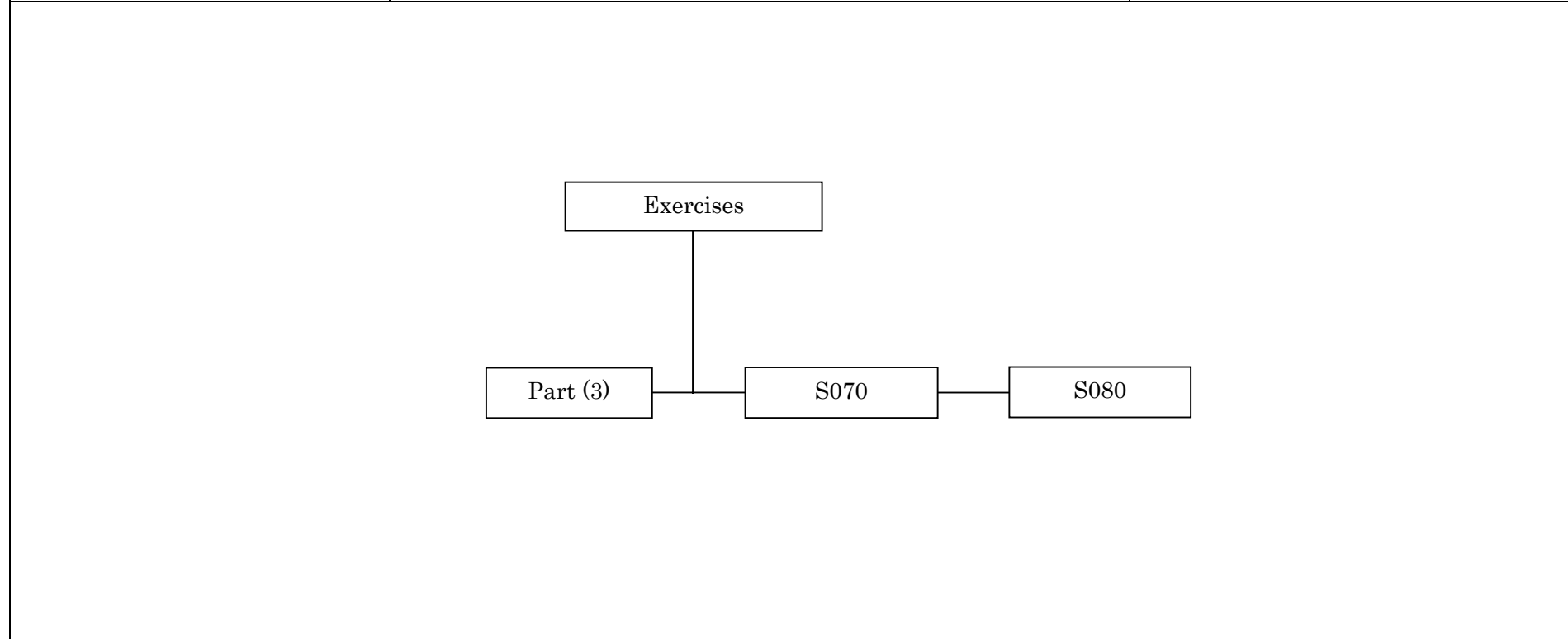
Narration ID: S060-V01	
<ul style="list-style-type: none"><li>□ Soft music.</li></ul>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S060
Define [ ] screen [ ]animation [ ]question	Time line ID: OPM-L8-S060-T01
	Display, move, narration
	<ul style="list-style-type: none"><li>□ 5 minutes.</li></ul>

Basic design Sheet (for Physics) Framework & Cluster

Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [ ]Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
Level: [X] Part	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8
No: 4	Part title: Exercises	



Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S070	
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie			
<p><u>Exercises:</u></p> <p><u>Exercise (1):</u> Exercise 11 on page <u>191</u> from the textbook, and its answer is in the teacher's guidebook.</p>		<p>Related material:</p> <p>Time line ID: OPM-L8-S070-T01</p> <p>Narration ID: S070-V01</p>	
		<p>Interaction:</p> <p>Back: Part (3)</p> <p>Next: _____</p> <p>Anther:</p>	
		<p>Simple time line</p>	
		<p>Comment</p>	

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S080
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><u>Exercise (2):</u> An object is placed 12 cm from a concave lens forming an image 4 cm from the lens. Calculates the focal length of that lens.</p> <p><u>Solution:</u></p> $\frac{1}{f} = \frac{1}{o} + \frac{1}{i}$ $= \frac{1}{12} + \frac{1}{-4} = \frac{1-3}{12} = \frac{-2}{12}$ $f = -\frac{12}{2} = -6 \text{ cm.}$		<p>Related material: Time line ID: OPM-L8-S080-T01 Narration ID: S080-V01</p> <hr/> <p>Interaction: Back: Part (3) Next: —— Anther:</p> <hr/> <p>Simple time line</p> <hr/> <p>Comment</p>



Detail design Sheet (for Physics)

Narration ID: S070-V01	
<ul style="list-style-type: none"><li><input type="checkbox"/> Soft music.</li></ul>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S070
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input checked="" type="checkbox"/> question	Time line ID: OPM-L8-S070-T01
Display, move, narration	
<ul style="list-style-type: none"><li><input type="checkbox"/> 5 minutes.</li></ul>	

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S08
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Storyboard ID: S08-A0
	Screen summary
	Display, move, narration
	<div data-bbox="277 416 735 678" style="border: 1px solid black; padding: 5px;"> <p><u>Exercises:</u></p> </div> <div data-bbox="772 416 1174 443"> <p>The exercise appears on the screen.</p> </div>
	<div data-bbox="272 763 727 1025" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="268 1070 722 1332" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="272 1397 727 1659" style="border: 1px solid black; height: 117px;"></div>
	<div data-bbox="272 1715 727 1977" style="border: 1px solid black; height: 117px;"></div>

Detail design Sheet (for Physics)

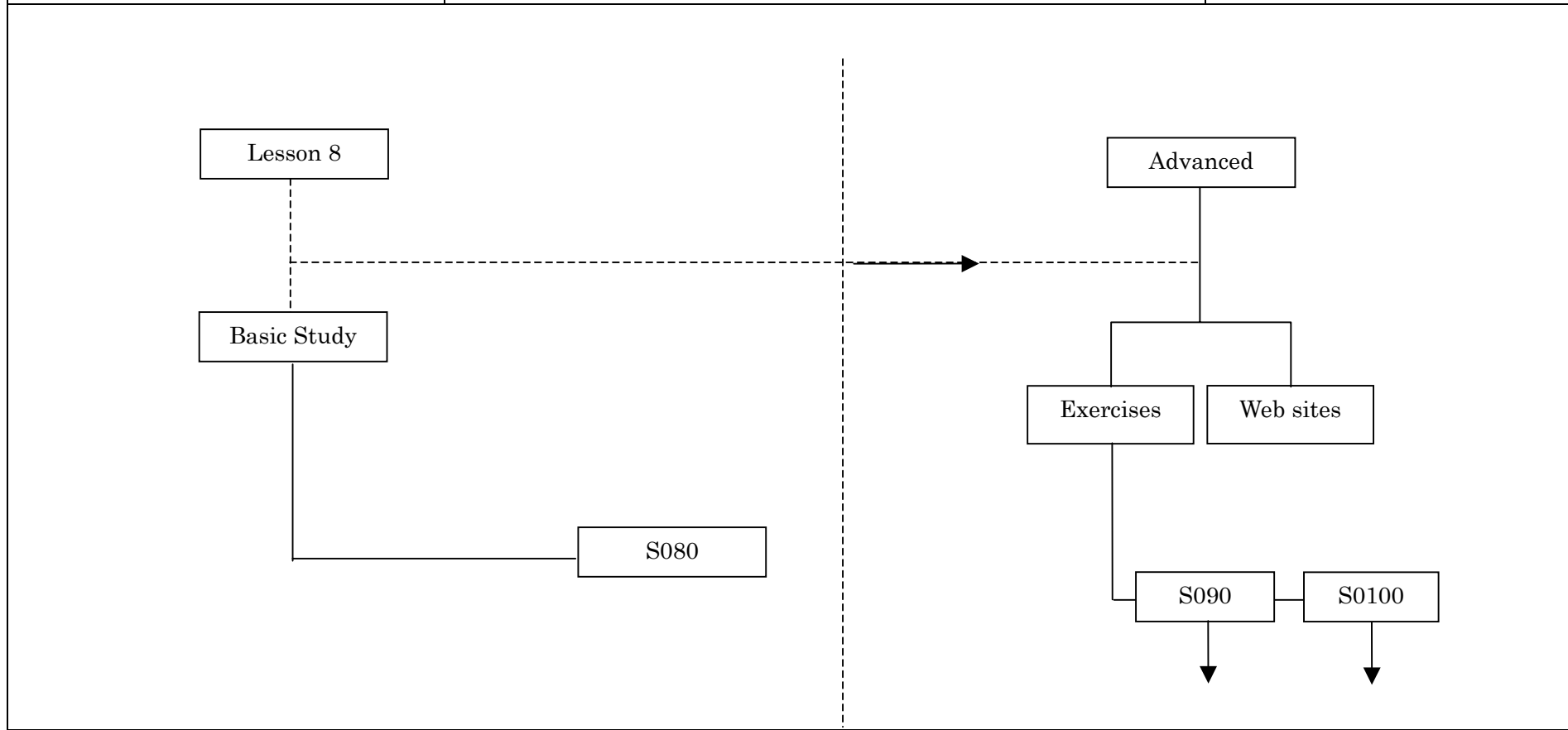
Narration ID: S080-V01	
<ul style="list-style-type: none"><li>□ Soft music.</li></ul>	
Narration ID:	
Narration ID:	

Detail design sheet (for Physics) Storyboard

Title: Time Line	Upper ID: OPM-L8-S080
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input checked="" type="checkbox"/> question	Time line ID: S080-T01
	Display, move, narration
	<ul style="list-style-type: none"><li><input type="checkbox"/> 4 minutes.</li></ul>

Basic design Sheet (for Physics) Framework & Cluster

Title: Framework & Cluster	Course Name: Physics Grade 11	Course ID: PhyG11
Level: [ ]Course, [ ]Chapter, [X]Lesson	Chapter title: Optical Properties of Matter.	Chapter ID: OPM
Level: [X] Part	Lesson title: Characteristics of images formed for an object in lenses.	Lesson ID: OPM-L8
No: Advanced.	Part title: Advanced study.	



Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S0100
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><u>Exercise (2):</u>                  An object 6 cm long is placed in front of a lens, forming an image 6 cm long on a screen 60 cm away from the object. Answer what follows:</p> <ol style="list-style-type: none"> <li>1. Determine the type of the lens.</li> <li>2. Draw the image.</li> <li>3. Find the magnification.</li> <li>4. Calculate the distance of the image from the lens.</li> <li>5. Calculate the focal length of the lens.</li> </ol>	Related material: Time line ID: Narration ID:	
	Interaction: Back: Next: Anther:	
	Simple time line	
	Comment	

Detail design Sheet (for Physics)

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID: S090
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
<p><u>Supplementary exercises:</u></p> <p><u>Exercise (1):</u> An object is placed 2 cm from the focal point of a convex lens, whose focal length is 6 cm. The image formed is magnified twice. Calculate:</p> <ol style="list-style-type: none"> <li>1. The distance of the object.</li> <li>2. The distance of the image.</li> </ol>	<p>Related material:</p> <p>Time line ID:</p> <p>Narration ID:</p>	
	<p>Interaction:</p> <p>Back:</p> <p>Next:</p> <p>Anther:</p>	
	<p>Simple time line</p>	
	<p>Comment</p>	



Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S010
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Storyboard ID: S010-
Screen summary	Display, move, narration
<div data-bbox="256 416 715 678" style="border: 1px solid black; padding: 10px;"> <p><u>Supplementary Exercises:</u></p> </div>	<p>Supplementary Exercises.                  The text appears on the screen.</p>
<div data-bbox="252 763 708 1025" style="border: 1px solid black; height: 117px;"></div>	
<div data-bbox="252 1111 708 1373" style="border: 1px solid black; height: 117px;"></div>	
<div data-bbox="252 1413 708 1675" style="border: 1px solid black; height: 117px;"></div>	
<div data-bbox="252 1738 708 2000" style="border: 1px solid black; height: 117px;"></div>	

Detail design sheet (for Physics) Storyboard

Title: story board	Upper ID: OPM-L8-S09
Define <input type="checkbox"/> screen <input type="checkbox"/> animation <input type="checkbox"/> question	Storyboard ID: S09-
Screen summary	Display, move, narration
<div data-bbox="255 434 715 698" style="border: 1px solid black; padding: 5px;"> <p><u>Supplementary Exercises</u>: ....</p> </div>	<p>Supplementary Exercises.                  The text appears on the screen.</p>
<div data-bbox="245 766 705 1025" style="border: 1px solid black; height: 116px;"></div>	
<div data-bbox="245 1084 705 1344" style="border: 1px solid black; height: 116px;"></div>	
<div data-bbox="245 1397 705 1657" style="border: 1px solid black; height: 116px;"></div>	
<div data-bbox="245 1711 705 1971" style="border: 1px solid black; height: 116px;"></div>	

Title: Screen	Lesson ID: OPM-L8	Screen & Media ID:
Define <input checked="" type="checkbox"/> Screen <input type="checkbox"/> Graphic ID <input type="checkbox"/> Simulation <input type="checkbox"/> Animation <input type="checkbox"/> movie		
<ol style="list-style-type: none"> <li>1. <a href="http://www.glenbrook.k12.il.us/gbssci/phys/class/refrn/u1415eb.html">http://www.glenbrook.k12.il.us/gbssci/phys/class/refrn/u1415eb.html</a></li> <li>2. <a href="http://www.sasked.gov.sk.ca/docs/physics/u6b2phy.html">http://www.sasked.gov.sk.ca/docs/physics/u6b2phy.html</a></li> <li>3. <a href="http://www.glenbrook.k12.il.us/gbssci/phys/class/refrn/u1415db.html">http://www.glenbrook.k12.il.us/gbssci/phys/class/refrn/u1415db.html</a></li> <li>4. <a href="http://physics.bu.edu/~duffy/PY106/Lenses.html">http://physics.bu.edu/~duffy/PY106/Lenses.html</a></li> <li>5. <a href="http://www.place.dawsoncollege.qc.ca/~Stella_Joseph/Chap36B.htm">http://www.place.dawsoncollege.qc.ca/~Stella_Joseph/Chap36B.htm</a></li> <li>6. <a href="http://www.uidaho.edu/LS/Physics/xp213-09.htm">http://www.uidaho.edu/LS/Physics/xp213-09.htm</a></li> <li>7. <a href="http://agamemnon.cord.org/cm/leot/course06_mod08/mod06_08.htm">http://agamemnon.cord.org/cm/leot/course06_mod08/mod06_08.htm</a></li> </ol>		Related material: Time line ID: Narration ID:
		Interaction: Back: Next: Another:
		Simple time line
		Comment

## Appendix 7: How to Design Contents

### Design for Developing Digital Self-learning material

May 2002

Padeco co.,LTD.

#### 1.Objectives

(1) To make an effective materials.

To collect the idea of more than one person.

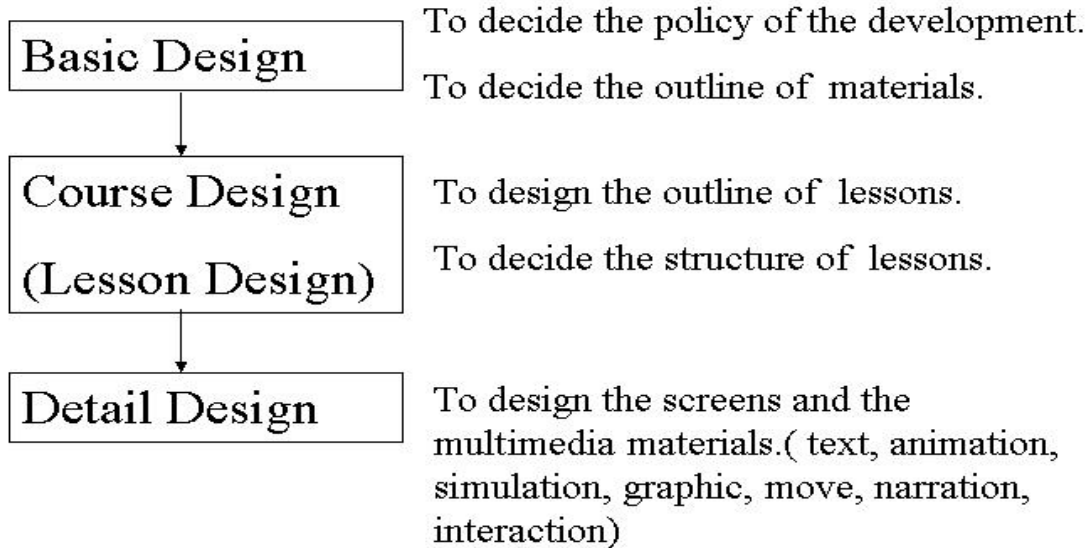
To check the design from the documents.

(2) To define the specification for programmer

The specifications aren't vague .

To understood what kind of information is  
necessary for the programmer.

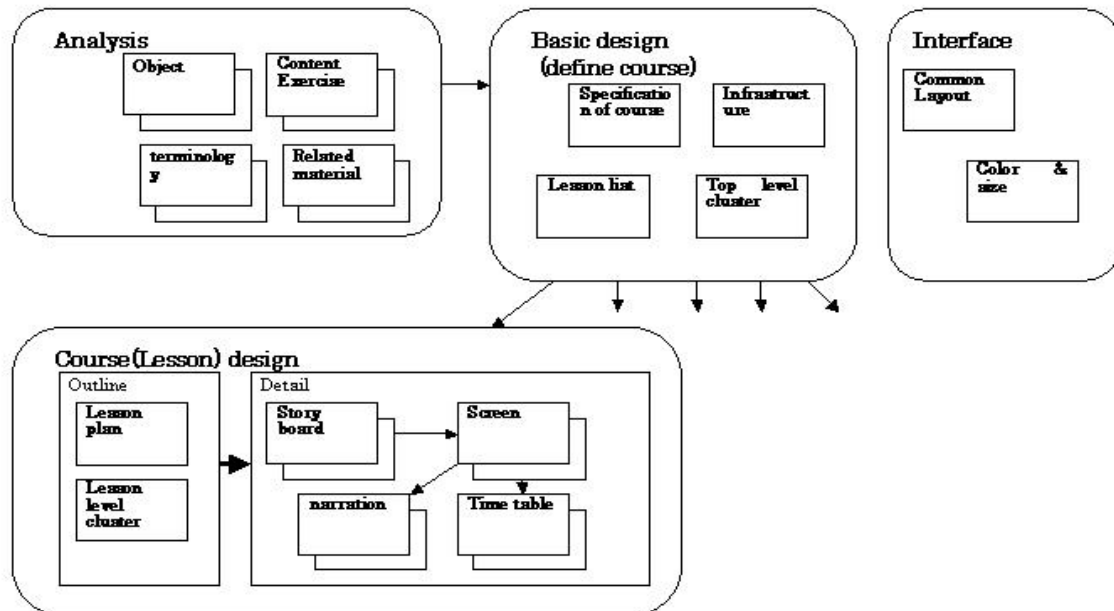
## 2. Steps of Design



## 3. Design forms (1)

phase	Document name	File name	To use	Task Allocation		
				JICA	Counter part	Contractor
Basic Design	Infrastructure	P_Infrastructure.doc	Describe a PC & Network environment & Developing tools	**	..	
	Specification of Course	B_SpecCourse.doc	Describe a Specification of Course	**	..	
	Lesson list	B_LessonList.doc	Describe a summary of Lessons	..	**	
	Top level cluster	B_Cluster.doc	Describe a top level structure of digital material	**	..	
Basic Design (Interface)	Common Layout	B_Layout.doc	Describe a common screen layout	**	..	++
	Color & Font	CD_ColorSize.doc	Define color & font size	**	..	++
Course (Lesson) Design	Lesson plan	B_LessonPlan.doc	Describe Lesson plan of a lesson	..	**	
	Lesson level cluster	B_Cluster.doc	Describe a lesson level structure of digital material	..	**	
Detail Design	Story board	CD_storyboard.doc	Describe a Continuity of content	..	**	
	Screen	D_screen.doc	Define text, graphic, etc..	..	**	
	Time line	D_timeline.doc	Define a sequence of materials	..	**	
	narration	D_narration.doc	Define a narration	..	**	
	Glossary	D_glossary.doc	Define a glossary	..	**	
	Reference list	D_Reference list.doc	Define a Reference	..	**	

### 3. Design forms(2)



#### Basic design

##### 1 Infrastructure

##### Network & PC Specification

To Know and decide what media and software available.

If PC power is low, animation can't be used.

In this project , PC in school has good power to use multimedia material.

(on board VGA?)

## Basic design

### 2 Lesson list

Topic	time	Chapter	Lesson	time
Interaction of light with matter	2	9	1	1
??	5	Optical	2	1
Interaction of light with matter		Properties of	3	1
Reflections by two spherical planes.		Matter	4	1
Lens	7		5	1
The properties of images in Lenses			6	1
The Question of lens			7	1
The focal length of lenses			8	1
Simple Harmonic Motion	2		9	1
Wave Motion	1		10	1
Type Of Waves	1		11	1
Properties Of Waves	2		12	1
Standing Waves	1	10	1 Simple Harmonic Motion	1
Interference Of light Waves	1		2	1
Diffraction Of Waves	1	Oscillatory	3 Wave Motion	1
Diffraction Of Light Waves	1	Motion and	4 Type Of Waves	1
Polarization Of Light; Polarized Waves	1	Waves	5 Properties Of Waves	1
Polarization Of Light; Polarization Of Light By Reflection	1		6	1
			7 Standing Waves	1
			8 Interference Of light Waves	1
			9 Diffraction Of Waves	1
			10 Diffraction Of Light Waves	1
			11 Polarization Of Light; Polarized Waves	1
			12 Polarization Of Light; Polarization Of Light By Reflection	1

## Basic Design

### 3. Specification of course

We have to decide ....

(1) storage.

CD-ROM

Server Disk <- CD-ROM

## Basic Design

(2) language (developing tool).

Html + Flash + Java

Html + Flash + Java + Server Program

Authorware

(if possible , 2 or 3 lessons are developed by  
Author ware)

## Basic Design

(3) experiment

only virtual experiment

virtual experiment + real experiment

( How about analysis)



## Basic Design

### (4) workbook and note

- only screen
- use workbook or note

## Basic Design

### (5) collaboration (interaction among students )

- non
- real communication (discussion ...)
- virtual communication (BBS )

interaction between students and a teacher.

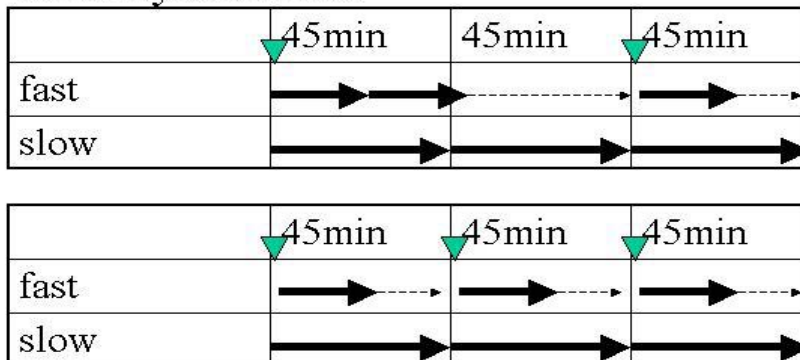
## Basic Design

### (6) Digital Lesson

1 Lesson = 45 min

1 Lesson = 45 min \* n

When synchronize



## Basic Design

### (7) Self learning

self-learning without teacher

self-learning with teacher

## **Basic Design**

**(8) lesson with digital material**

**make teacher menu**

**we will compare the self-learning and the  
lesson with digital material in the project.**

## **Basic design**

**4 Top level cluster**

**5 Common layout**

**This framework is a typical design.**

## **Course design**

### **1. lesson plan.**

**define the story of the one lesson.**

**method.**

**collaboration (use card)**