PHYSICS IN IB SCHOOL

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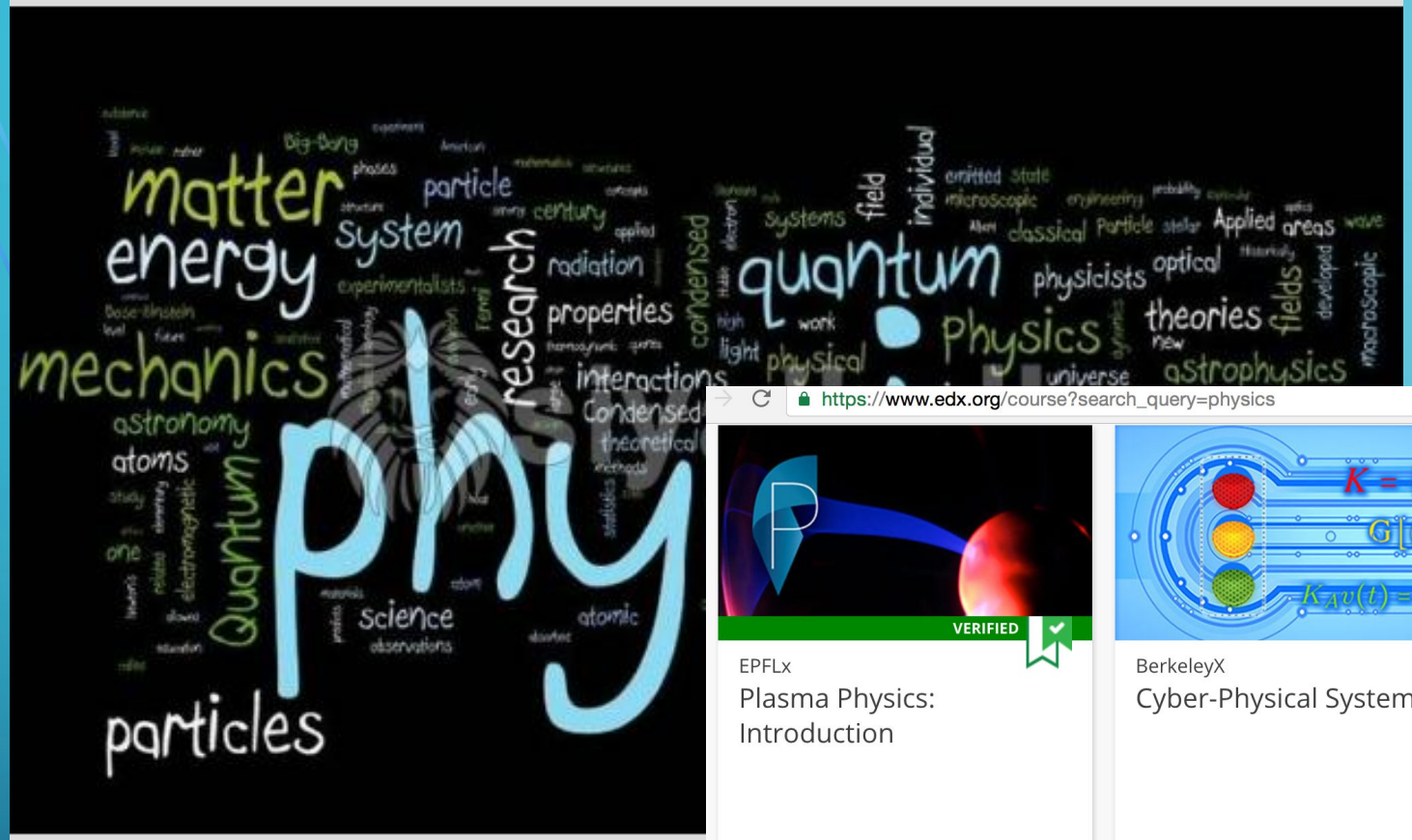
SKOLKOVO INTERNATIONAL GYMNASIUM

TOPICS TO COVER:

- Why do we study physics in English?
- IB School experience
  - Curriculum
  - Unit planner
  - Optics as an example
  - Assessment
- Practiced textbooks



https://www.edx.org/course?search_query=physics

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EPFLx

Plasma Physics: Introduction

Current
Self-Paced

BerkeleyX

Cyber-Physical Systems

Archived
Starts: May 6, 2014

VERIFIED

EPFLx

Plasma Physics: Applications

Current
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RICEx

AP Physics 1

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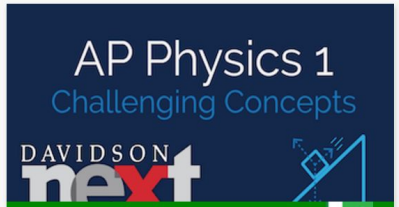
AP® Physics 2 - Part 3:



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DavidsonNext

AP® Physics 1:

Refine your search

Availability

Current	45
Starting Soon	7
Upcoming	12
Self-Paced	40
Archived	77

Subjects

Architecture	2
Art & Culture	3
Biology & Life Sciences	16
Business & Management	6
Chemistry	8
Communication	2
Computer Science	19
Data Analysis & Statistics	5
Economics & Finance	2
Education & Teacher Training	4

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Mod-01 Lec-37 Perturbation Theory - II Video Lecture:

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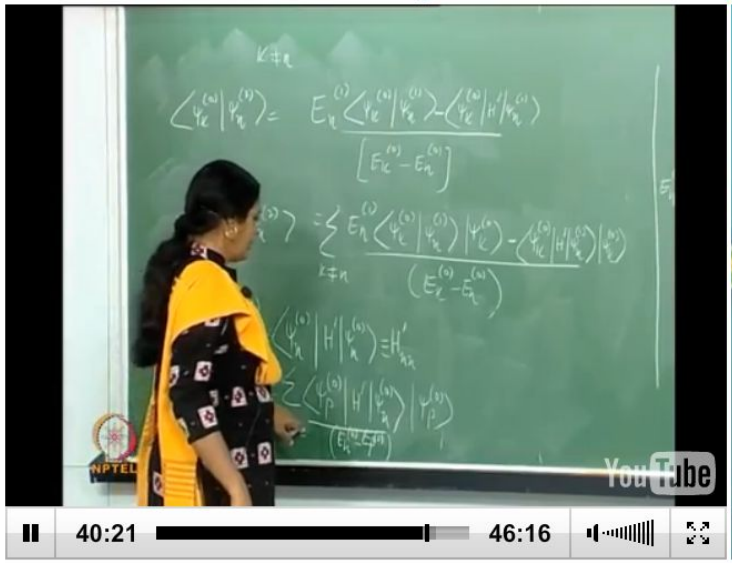

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Back to Quantum Mechanics I course
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Lecture duration: 46 min

Mod-01 Lec-37 Perturbation Theory - II

This is a video lecture series on Quantum Mechanics I by Prof. S. Lakshmi Bala, Department of Physics, IIT Madras.....

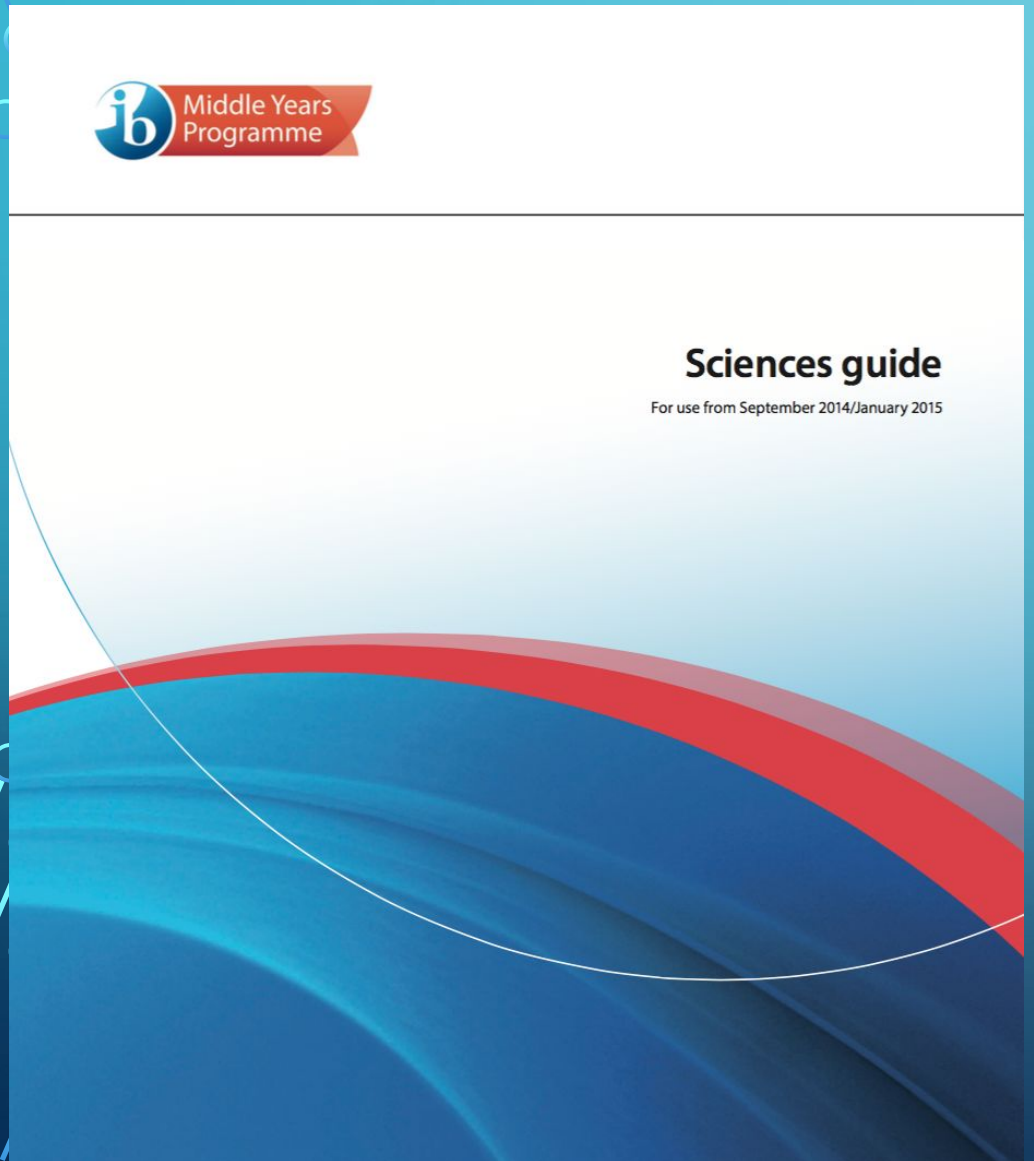
SKOLKOVO INTERNATIONAL GYMNASIUM

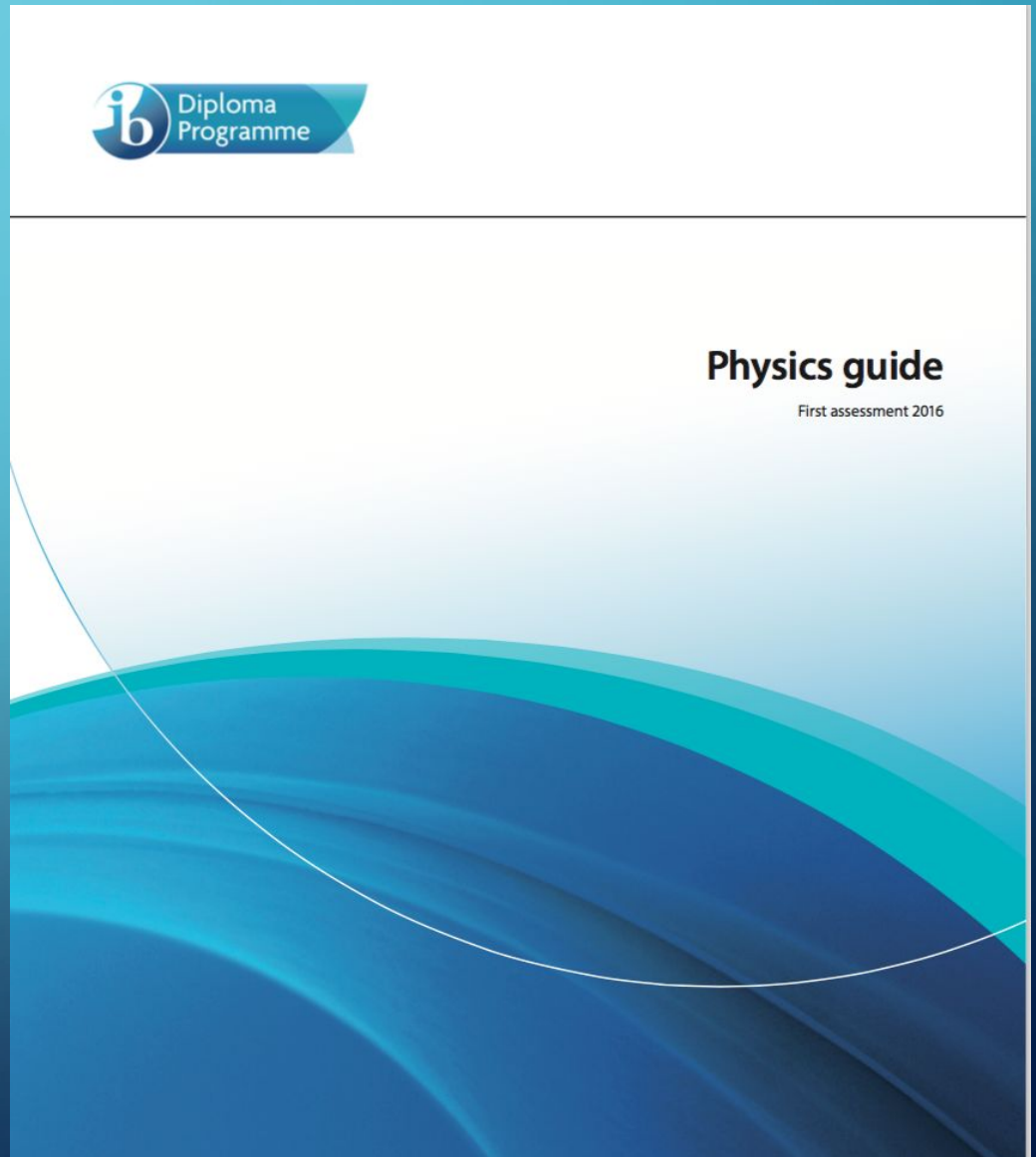
WHAT IS IB SCHOOL?

- PYP, MYP and DP programmes.
- Vertical and horizontal planning,
- Guide references
- Global contexts


IB MIDDLE YEARS PROGRAMME
LANGUAGE AND LITERATURE
LANGUAGE ACQUISITION
INDIVIDUALS AND SOCIETIES
PHYSICAL AND HEALTH EDUCATION
MATHEMATICS
SCIENCES
ARTS
DESIGN
ACTION • SERVICE
COMMUNITY PROJECT • PERSONAL PROJECT
CONCEPTS · APPROACHES TO TEACHING · GLOBAL CONTEXTS
· APPROACHES TO LEARNING ·
THE IB LEARNER PROFILE
INTERNATIONAL-MINDEDNESS

MYP AND DP GUIDES





KEY CONCEPTS

Aesthetics	**Change**	Communication	Communities
Connections	Creativity	Culture	Development
Form	Global interactions	Identity	Logic
Perspective	**Relationships**	**Systems**	Time, place and space

Table 1

MYP key concepts

- Table 1 lists the key concepts to be explored across the MYP. The key concepts contributed by the study of sciences are **change, relationships** and **systems.**

Change

- Change is a conversion/shift/movement from one state to another. Exploring change allows students to examine forces that shape the world: past, present and future. Inquiry into the concept of change invites students to consider causes, processes and consequences: natural and artificial, intentional and unintentional, positive and negative.

Relationships

- Relationships allow students to identify and understand the connections and associations between properties, forces, objects, people and ideas, including the human community's connection with the worlds in which we live.

Systems

- Systems are sets of interacting or interdependent components. Everything in the known universe is a component of a system and generally also a part of multiple interacting and interdependent systems.

RELATED CONCEPTS

- Related concepts promote deep learning. They are grounded in specific disciplines and are useful for exploring key concepts in greater detail.

The related concepts in physics		
Development	Environment	Transformation
Consequences	Energy	Evidence
Form	Function	Interaction
Models	Movement	Patterns

Table 2c

Related concepts in physics

GLOBAL CONTEXTS FOR TEACHING AND LEARNING

Global contexts direct learning toward independent and shared inquiry into our common humanity and shared guardianship of the planet. Using the world as the broadest context for learning, MYP sciences can develop meaningful explorations of

- identities and relationships
- orientation in time and space
- personal and cultural expression
- scientific and technical innovation
- globalization and sustainability
- fairness and development.

STATEMENTS OF INQUIRY

Statements of inquiry set conceptual understanding in a global context in order to frame classroom inquiry and direct purposeful learning. Table below shows some possible statements of inquiry for possible units of work in MYP sciences.

Statement of inquiry	Key concept Related concepts Global context	Possible project/study
Increasing electrical energy production to meet the needs of an expanding global population can have environmental consequences.	• Change • Environment, consequences, development, energy • Globalization and sustainability	Physics: magnetism and electricity

STATEMENTS OF INQUIRY

Statement of inquiry	Key concept Related concepts Global context	Possible project/study
Technological advances like nuclear energy affect the relationship between humans and the natural environment.	• Relationships • Consequences, energy, evidence • Scientific and technical innovation	Physics: nuclear energy
Technology designers creatively apply energy transformations in order to develop and reinvent devices.	• Systems • Energy, transformation, development • Scientific and technical innovation	Physics: application of physics

UNIT EXAMPLE "OPTICS", 8TH GRADE

Key concept: Relationships

Related concept: Evidence

Global contexts: Scientific and technical innovation

Statements of inquiry: Study of light transmission through different materials has lead to invention of optical devices.

TEAM WORK

- goo.gl/3Nh1bE
- Please go to the link, choose class, any unit and try to figure out key concept, related concept, global context. Share your ideas with your colleagues.

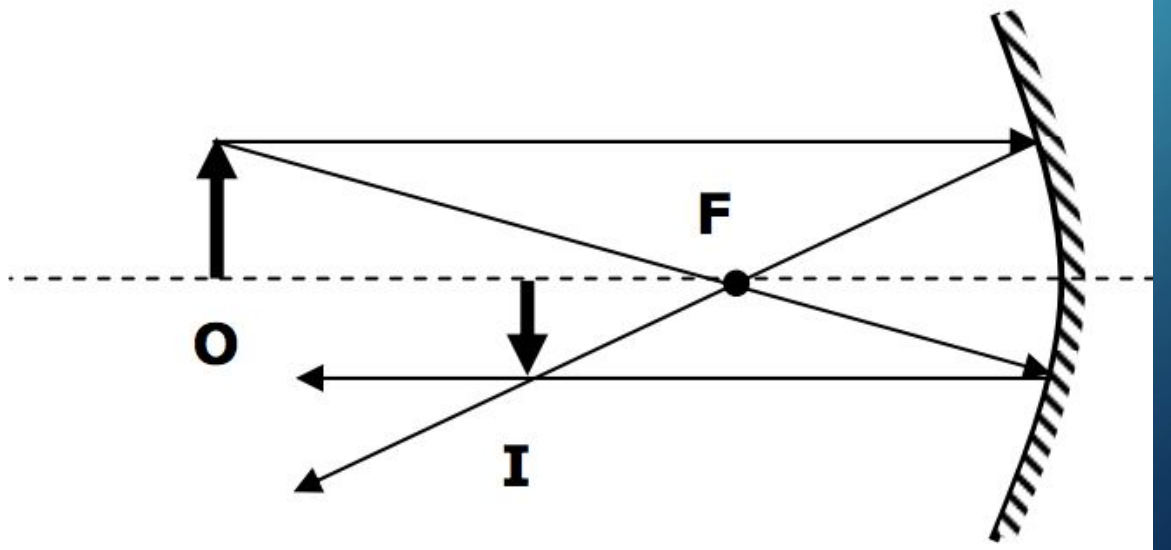
OBJECTIVES AND ASSESSMENT

- A. Knowing and understanding
- B. Inquiring and designing
- C. Processing and evaluating
- D. Reflecting on the impacts of science

A. KNOWING AND UNDERSTANDING

- Determine the nature of the images formed by the mirrors and lenses shown below. Is the image: Real or virtual? Upright or inverted? Enlarged or diminished? **O** stands for the object, **I** for the image, and **F** is the focal point.

2. Concave mirror

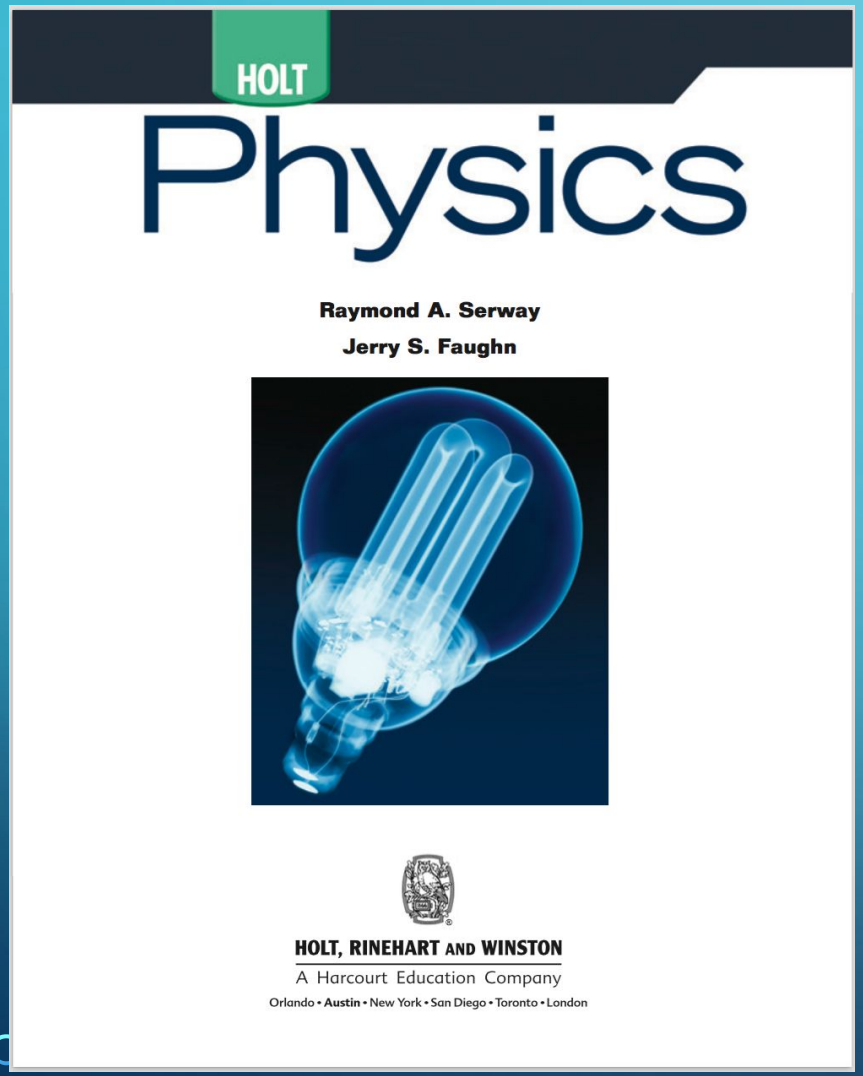


B. INQUIRING AND DESIGNING
C. PROCESSING AND EVALUATING

- These are laboratory works where students show their ability to hold practical work.

D. REFLECTING ON THE IMPACTS OF SCIENCE

TEXTBOOKS



College Physics

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Introductory Physics I

Elementary Mechanics

by

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Students who hope to succeed in learning physics from this text will need, as a minimum prerequisite, a ***solid grasp of basic mathematics***. It is strongly recommended that all students have mastered mathematics at least through single-variable differential calculus (typified by the AB advanced placement test or a first-semester college calculus course). Students should also be *taking* (or have completed) single variable integral calculus (typified by the BC advanced placement test or a second-semester college calculus course). In the text it is presumed that students are competent in geometry, trigonometry, algebra, and single variable calculus; more advanced multivariate calculus is used in a number of places but it is taught in context as it is needed and is always "separable" into two or three independent one-dimensional integrals.

Many students are, unfortunately *weak* in their mastery of mathematics at the time they take physics. This enormously complicates the process of learning for them, especially if they are years removed from when they took their algebra, trig, and calculus classes (as is frequently the case for pre-medical students taking the course in their junior year of college). For that reason, a separate supplementary text intended ***specifically to help students of introductory physics quickly and efficiently review the required math*** is being prepared as a companion volume to all semesters of introductory physics. Indeed, it should really be quite useful for any course being taught with any textbook series and not just this one.

This book is located here:

http://www.phy.duke.edu/~rgb/Class/math_for_intro_physics.php

and I *strongly suggest* that all students who are reading these words preparing to begin studying physics pause for a moment, visit this site, and either download the pdf or bookmark the site.

Note that *Week 0: How to Learn Physics* is not part of the course *per se*, but I usually do a quick review of this material (as well as the course structure, grading scheme, and so on) in my first lecture of any given semester, the one where students are still finding the room, dropping and adding courses, and one cannot present real content in good conscience unless you plan to do it again in

THANK YOU FOR YOUR ATTENTION!