



**Everything is about Physics!**  
**Recommending a Strategy**

## Why Quantum Mechanics?

**" The ultimate aim of the modern movement in biology is in fact to explain all biology in terms of physics and chemistry... Quantum mechanics, together with our empirical knowledge of chemistry, appears to provide us with a 'foundation of certainty' on which to build biology."**



Francis Crick  
1966



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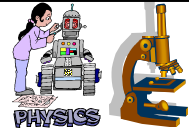
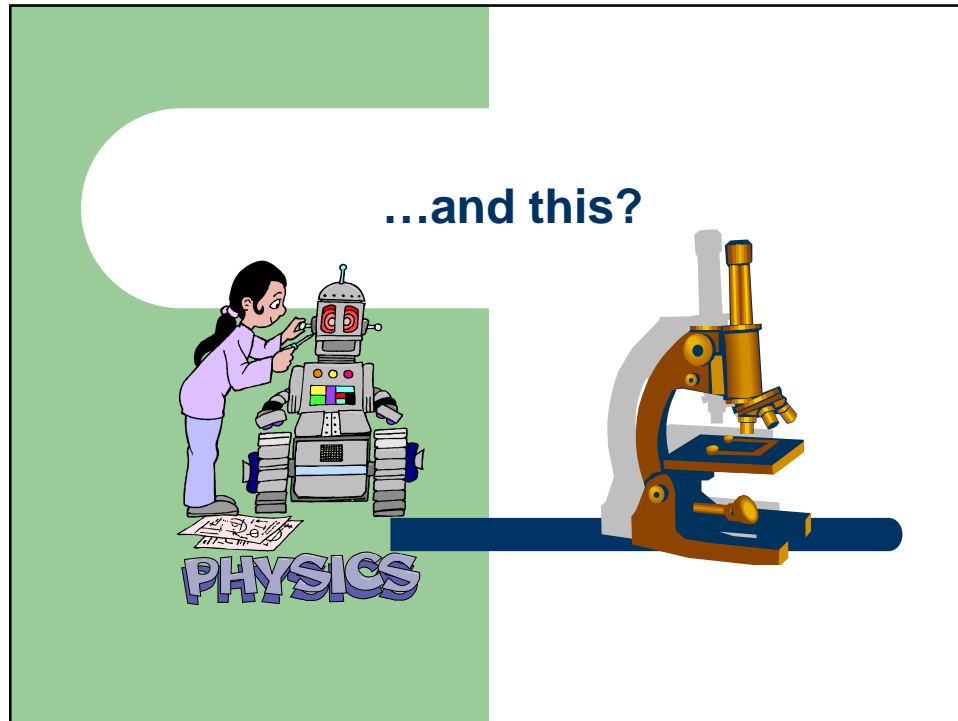
## What is this?



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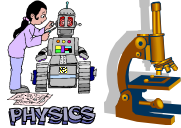
## Vision Statement

- To develop a love of physics,.....
- ....make it possible for the students to see the connection between different science courses,....
- ....and show them the relevance of their learning in physics to their possible future professions.....
- .....by providing them with the knowledge of applications in different fields.

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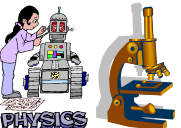
## Goal and Objective

- More students take physics in senior classes

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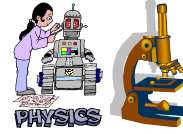
## Today's Situation

- Closed compartments
- Cross curricular projects (physics and biology) not significant
- Most applications that we relate to, and the experiments that the students perform in Physics, are related to objects

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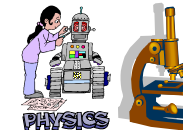
## How Did We Get Here?

- Examples and applications that we give are about objects, cars, pulleys
- Not many texts have the applications to the human body
- We cannot keep doing this as.....

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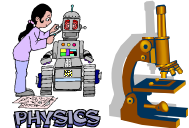
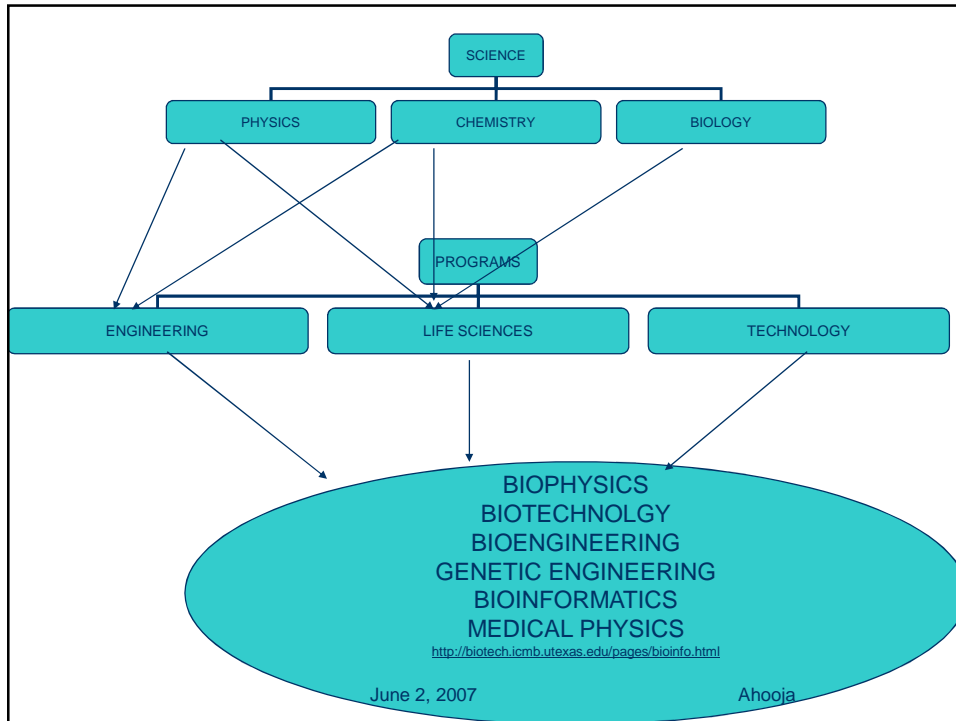
...the education environment is changing very rapidly

....the students are changing rapidly

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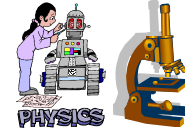
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## Available Options

- When the students are learning any topic in physics, an example in biology or life sciences or sports or even painting and dancing should be shown, together with the usual ones

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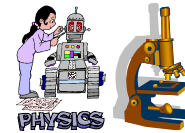
## Available Options

- As Harold Varmus, M.D., Director, National Institutes of Health says, *"....the human body and its components are physical objects that can be viewed and measured and altered in ways that resemble what a physicist might do with any physical object.....physics transformed the study of living things by helping to discover the principles of heredity....."*

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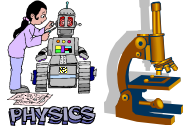
## Available Options

*".....repeating peaks and valleys of my electrocardiogram as a record of voltage changes in the salty sea of a human body. .... the doyens of our biochemistry department had become famous by being the first to tag red blood cells with easily detected radioisotopes to learn how long such cells survived in the body."*

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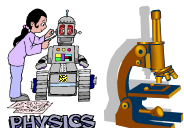
## Available Options

- This can be in the form of a class discussion, a lab, a research project, an assignment, a video/DVD, a software, .....ideas??????

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## Advantage

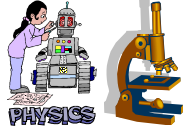
- The advantage of doing this would be that the students will realise that physics concepts are being followed during every fraction of their time, whether they are breathing, thinking, eating, playing, working on their laptops

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## Recommendations

- Now let us look at some ideas that can be implemented in our physics classes
- Design some activities/labs/assignments/report with each one of these topics

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## Recommendations

Mechanics - Kinematics & Dynamics:

- Kinesiology
- Orthopaedics
- Heart Motion
- DNA (Torque)
- Centrifuge & CT Scan
- Bio-Mechanics
- How one can make their sport skills better

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## Recommendations

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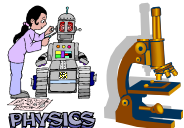
### Elasticity & Strength of Materials

- Movement of Muscles
- Stress in Muscles
- Athletic Therapy
- Sport injuries

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## Recommendations

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### Fluids:

- Blood Pressure
- Blood Flow
- Heart as a pump
- .....

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## Recommendations

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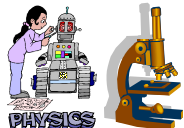
### Waves & Sound

- Hearing
- Stethoscope
- Ultrasound
- Acoustic Microscope
- How do humans make sound?
- Larynx
- Musical Instruments

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## Recommendations

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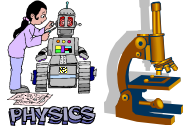
### Heat & Thermodynamics

- Transfer of heat in human body for heat balance
- Heat transfer during digestion and metabolism
- Warm and cold blooded animals

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## Recommendations

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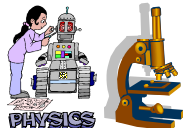
Electricity

- Nervous system (Emotions Circuit)
- Ion transfer at membranes
- Cell phones
- Computer
- and.....

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## Recommendations

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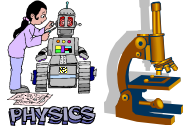
Magnetism

- Magnetic Resonance Imaging
- Magnetic Bracelets
- Electric guitar
- Nuclear Magnetic Resonance

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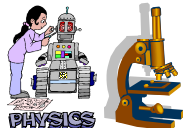
## Recommendations

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### Light & Optics

- Microscope
- Lenses
- Non Reflecting coating
- Fiber optics - Endoscopies
- Light microscopy
- Laser therapy
- Skin Treatment & Imaging
- Electron Diffraction Microscope

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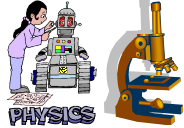
## Recommendations

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### X-Rays

- Radiology
- CT Imaging
- Carbon dating
- Study of DNA

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## Recommendations

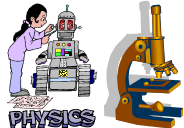
Others:

- Nuclear medicine
- Radiation therapy
- Positron emission tomography (PET)
- Pion therapy
- Tumour therapy (accelerators)
- Hodgkin's disease

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## How?

- What I do
- Ideas...
- Speakers

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