# Interactive Physics Textbooks

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## Interactive Teaching for 20+ Years

- Group Problem Solving (Heller, et. al. 1992)
- Physics by Inquiry (McDermott, et. al. 1996).
- Peer Instruction (Mazur 1997).
- Lecture Demonstrations (Sokoloff 1997).
- Just in Time Teaching (Novak, et. al. 1999)
- Socratic Dialog.
- Flipped Classroom.
- Etc. Your favorite method.

## But What about Books?

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## Interactive Books?

Free PDF (<u>OpenStax</u>). Customized PDF (<u>FlatWorld</u>).

Free WORD (Jeff Schnick: Calculus Based Physics).

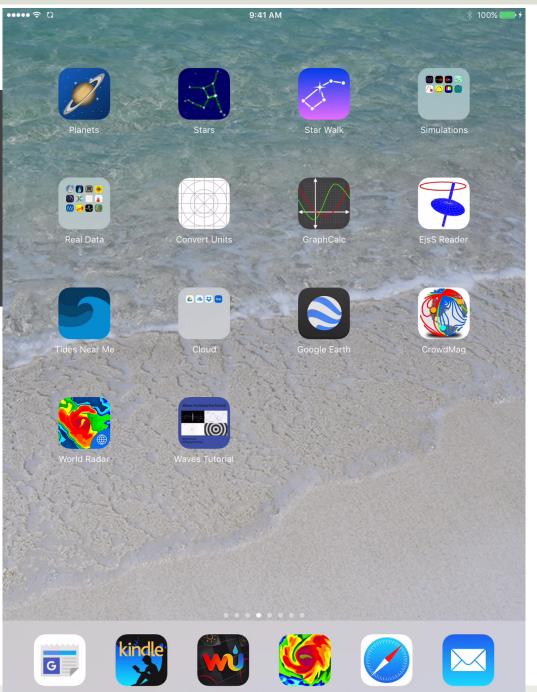
Wiki (<u>PrettyGoodPhysics</u>).

Hypertext (<u>HyperPhysics</u> -Georgia State).

Kinetic Books (<u>Perfection Learning</u>).

# Wave Tutorial

# on ITunes 2016



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 3.Interacciones externas
 4.Aplicaciones

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- <u>2.La combinación de las ondas</u>
- <u>3.Interacciones externas</u>
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About this book



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## Sound

### **iTunes** Preview

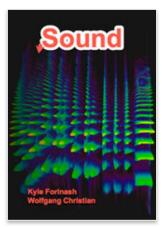
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### Sound

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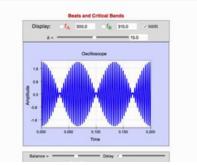
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#### Description

Sound is an interactive textbook that contains 33 interactive simulations which require the reader to click buttons, move sliders, etc. in order to answer questions about the behavior of waves and sound in particular. There are also links to videos and other online resources that pertain to the topics being covered as well as suggestions for laboratory exercises and sound clips for understanding the fascinating subject of sound and music. The goal is to create an engaging text that integrates the strengths of printed, static textbooks and the interactive dynamics possible with simulations to engage the student in actively learning the physics of sound.

### Screenshots



the frequency corresponding to note shown on the key. The buttons actop allow you to select the tunings of four different temperaments; chi different temperament will change the frequency of the notes betwee C an octave higher to match the chosen temperament. The notes mechanical because they are pure sine wave with no overtones and select fifth; C and F for this scale. Clicking on the overtone checkl add the first harmonic with the volume of the fundamental and the harmonic with a volume one third the fundamental to any note being The overtones are loader than would be normal for a stringed instruor orbitrious (Go back to chapter 10 to review beats and dissonanc have forgotten). Three chords used in popular music can also be plays C Major chord plays the notes on K; and D. F<sup>4</sup> (F hang) and A; the G major chord plays the notes of K; and D.

**Temperaments Simulatio** 

## Sound: An Interactive eBook by Kyle Forinash and Wolfgang Christian

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1.Physics of Vibrations

2.Waves 3.Sound and Perception

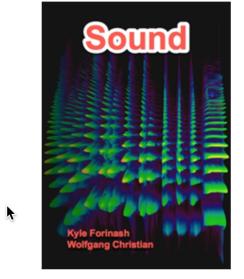
4.Electromagnetism and...

### Sound: An Interactive eBook

This book consists of 33 interactive simulations which require the reader to click buttons, move sliders, etc. in order to answer questions about the behavior of waves and sound in particular. There are also dozens of links to YouTube videos and other online resources that pertain to the topics being covered as well as suggestions for laboratory exercises and sound clips for understanding the fascinating subject of sound and music. The goal was to create an engaging text that integrates the strengths of printed, static textbooks and the interactive dynamics possible with simulations to engage the student in actively learning the physics of sound.

- <u>1.Physics of Vibrations</u>
- <u>2.Waves</u>
- <u>3.Sound and Perception</u>
- <u>4.Electromagnetism and Sound</u>
   <u>Reproduction</u>

About this book



This online book uses a series of tutorials based on interactive simulations and animations to explore the physics of sound. Students develop their understanding of waves through guided questions and exercises based on these simulations.

An EPub edition is also available in the Apple iTunes store: ISBN-13: 978-0-9905805-5-3.

### Introduction to Sound

The physics of sound lends itself particularly well to examples, demonstrations and student participation in experiments. There are thousands of YouTube videos of interesting sound phenomena and dozens of simulations related to the physics of sound and music. This book was created from trying to provide access to these resources in a single source, first from a web page, then as interactive simulations on web pages and finally as this interactive textbook.

<u>ready-to-run</u> - <u>details</u>

# Was this Hard to Do?

**YES!** But not as hard as you think!

Easy Java/JavaScript Simulations by Francisco Esquembre:

www.um.es/fem/EjsWiki/

# Make Books Interactive!



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