

# The Virtual Lab - Using learning objects in VCE Physics

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# Learning objects

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- A learning object is a resource, usually digital and web-based, that can be used and re-used to support learning. (Definition from Wikipedia).
- Learning objects can integrate text, images, animation & video.
- Flash, Java applets, iMovie / Movie Maker, Keynote / Power Point, are some of the tools that can be used.
- Learning objects improve student learning by providing an animation / simulation of a concept that cannot easily be seen.
- Learning objects provide a means of reducing the workload of teachers by providing resources for easy access in class.

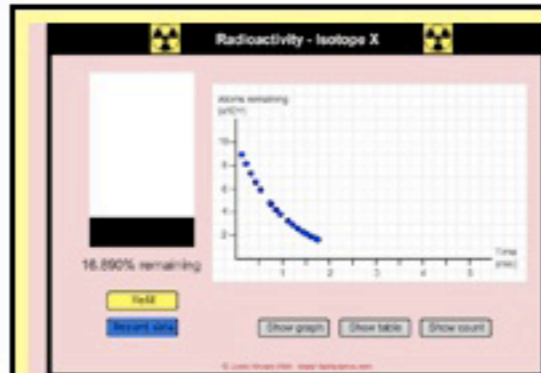
# Why Flash?

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- A picture tells a thousand words. An animation tells more!
- Frame based animation + interactivity - more learning is retained as the student has more involvement with the task, rather than just reading text.
- Flash: Ubiquitous, small file sizes, self-contained, cross-platform, easy to distribute via web or Mac / Windows application.
- Text, sound, video, scripting can all be integrated into the one object.

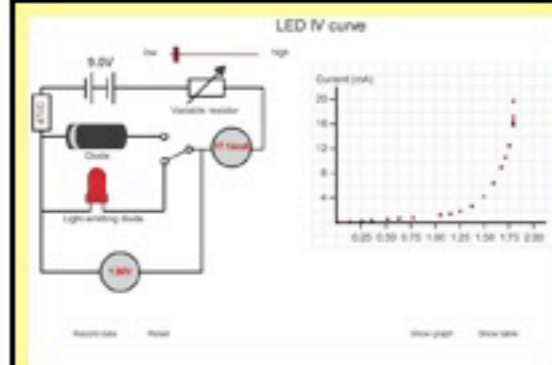
Jump to your subject area:

Subject areas



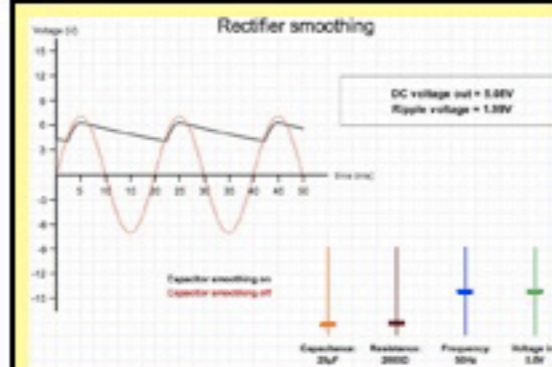
New for July: [Radioactive decay](#)

Investigate the decay over time of radioisotope X.



New for June: [Diode IV characteristics](#)

Investigate the relationship between voltage and current for diodes.



New for April: [Rectifier smoothing](#)

Explore the effects of changing variables in a rectifying circuit.

- Collection of my learning objects made over the past five years, primarily based on Physics concepts.
- Aiming to produce one new object every few months (time permitting). Most are tested in my class / school.
- Freely available to all on the internet.
- Learning objects are designed to be simple & illustrate a concept / physical relationship.
- Used by a number of Victorian schools (that I know of!). Averages around 10 - 20 visits per day during the term.
- Not the only such site but I think that it is the most appropriate style of content for senior students.
- A large collection of resources specifically targeted at VCE physics.

# Some of my own favourites...

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- My first project: Current divider.
- Really good tests of understanding: Light globes, Kirchhoff's law.
- The most involved Physics project: Transistor.
- The hardest scripting: Rectifier smoothing.

# How do the simulations work?

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- Basic Flash is frame animations.
- The relevant equations are scripted into the Flash file (through actionscript).
- Variables (eg resistance, capacitance) can be changed easily using a slider.
- Resulting values are given as dynamic text on screen.
- Data can be recorded in a table & copied out into a spreadsheet.
- Students must produce their own graphs & perform analysis (eg finding gradients of gain, RC etc) as they would from measured data.

# The Learning Federation

The Le@rning Federation Schools Online Curriculum Content Initiative

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## Latest news

[TLF wins IMS Learning Impact Awards](#)

TLF has won the Best Digital Learning Content Award and an IMS Learning Impact Leadership Award at a ceremony held in Texas, USA, on 12 May 2008. The IMS Global Learning Consortium recognises exemplary use of technology to improve learning across all industry segments worldwide.

[More news](#)

## Latest learning materials



Lapel badge for NSW Federation referendum

TLF ID: R8083

Reproduced courtesy of Mitchell Library, State Library of New South Wales

[View details](#)

[Explore what's new.](#)

## Latest research

[Effects of TLF's curriculum content on Indigenous students' motivation to learn and their engagement in learning](#)

This report is a direct result of work undertaken in a range of schools with significant Indigenous populations during 2007.

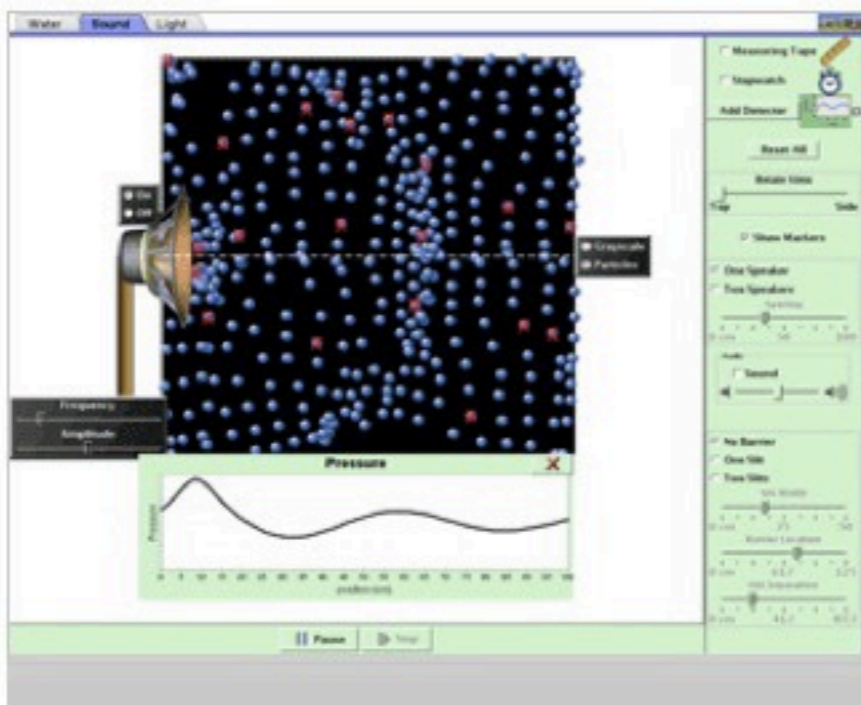
[More research](#)

# Al's relativistic adventures





[What's New](#) | [About PhET](#)



## Interactive Science Simulations

Fun, interactive, [research-based](#) simulations of physical phenomena from the PhET project at the University of Colorado.

[Play with sims... >](#)

 [Other languages...](#)

THE WILLIAM AND FLORA  
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Foundation

 Excellence Center  
of Science and  
Mathematics  
Education at King  
Saud University

▶ Run our Simulations	▶ Teacher Ideas & Activities	▶ Contribute	▶ Browse Sims
<ul style="list-style-type: none"> <li>▶ On Line</li> <li>▶ Full Installation</li> <li>▶ One at a Time</li> </ul>	<ul style="list-style-type: none"> <li>▶ Search for lessons created by teachers using PhET simulations.</li> <li>▶ Workshops</li> </ul>	<ul style="list-style-type: none"> <li>▶ Provide ideas you've used in class</li> <li>▶ Support PhET</li> <li>▶ Translate Simulations</li> </ul>	 <p><a href="#">Simulations &gt;&gt;</a></p>

# How do I use learning technologies in the classroom?

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- MHS Physics has had an intranet site for 10+ years. Students can access from home or at school. (Each Physics room has 8 computers.)
- This is used as the primary store of curriculum & information, as well as complementing texts & practical activities.
- Previously, Real Time Lab used webcam to view circuit controlled by web interface.
- Learning objects used to explain difficult concepts or simulate practical work.
- Learning objects mirror practical tasks. Students that miss practical work can complete an online simulation.
- We are currently using online learning objects as the basis of unit 3 Electronics & Photonics assessment tasks.
- Podcasts & forum - new for 2009.
- Flash based objects could replace a number of previous programs / pieces of equipment. (Saving money / storage space!!) eg Crocodile Physics, IEC magic boxes.



[MHS](#) > [Physics](#) > [Home](#)

## VCE Physics

### Quick links

- [Unit 1: Electricity](#)
- [Unit 3: Electronics & Photonics](#)
- [MHS Physics Podcast](#)

### Physics news

- **Physics 2010:** Students can make a head start by looking over the timelines & syllabus information for next year. (All areas of study, assessment tasks & resources for this year.)
- Don't forget to subscribe to the [MHS Physics Podcast](#).

The MHS Physics Podcast is here! Tune in for an explanation of some of the key concepts of VCE Physics, misconceptions, and on how to achieve the best results on the assessment tasks.



- Episode 1 - Welcome to 2009.
- Episode 2 - Are Friends Electric?
- Episode 3 - Radioactive decay... what's left in the bucket?
- Episode 4 - Keep On Movin'.
- Episode 5 - Gravity sucks.
- Episode 6 - Exam Time.
- Episode 7 - Sound's Great (enhanced podcast)

# Problems?

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- Flash player versions (often old / locked installations in schools).
- Apple doesn't like Flash - not supported on iPhone or iPad :(
- Usability - something I'm working on!
- Students become blasé about this level of interactivity (growing up on games!)
- Learning objects are not always valued by teaching staff as they don't have control over them & how students use them.
- “It is not real data.”

- [Flashscience.com](http://Flashscience.com)
- [The Learning Federation](#)
- [Al's relativistic adventures](#)
- [PhET](#)
- [The Instructional Use of Learning Objects](#)
- [DEECD Ultranet](#)
- [Flashkit forums](#)
- [Actionscript.org forums](#)

# Thanks for coming!

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- See you next year.