

The Virtual Lab - Using learning objects in VCE Physics

STAV Physics Conference
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Learning objects

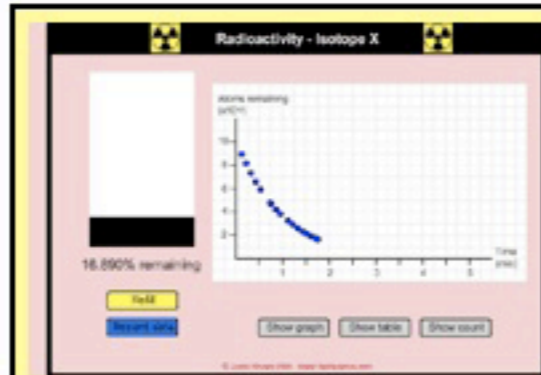
- A learning object is a resource, usually digital and web-based, that can be used and re-used to support learning. (Definition from Wikipedia).
- Learning objects can integrate text, images, animation & video.
- Flash, Java applets, iMovie / Movie Maker, Keynote / Power Point, are some of the tools 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?

- 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.

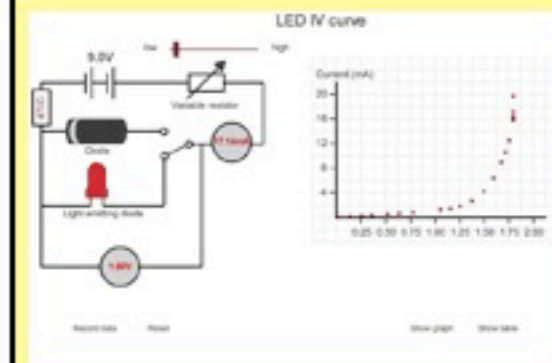
Jump to your subject area:

Subject areas



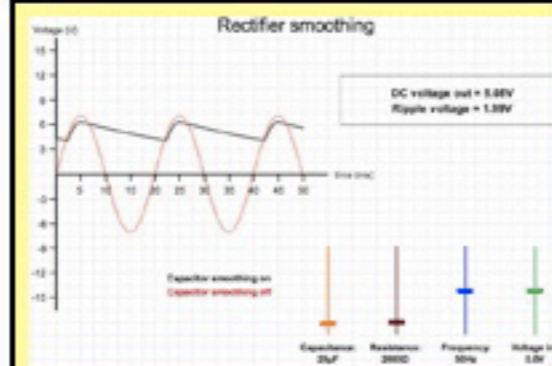
New for July: [Radioactive decay](#)

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.

About flashscience.com ...

- 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...

- 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.
- (The most time spent: Circles.)

How do the simulations work?

- 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

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[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.

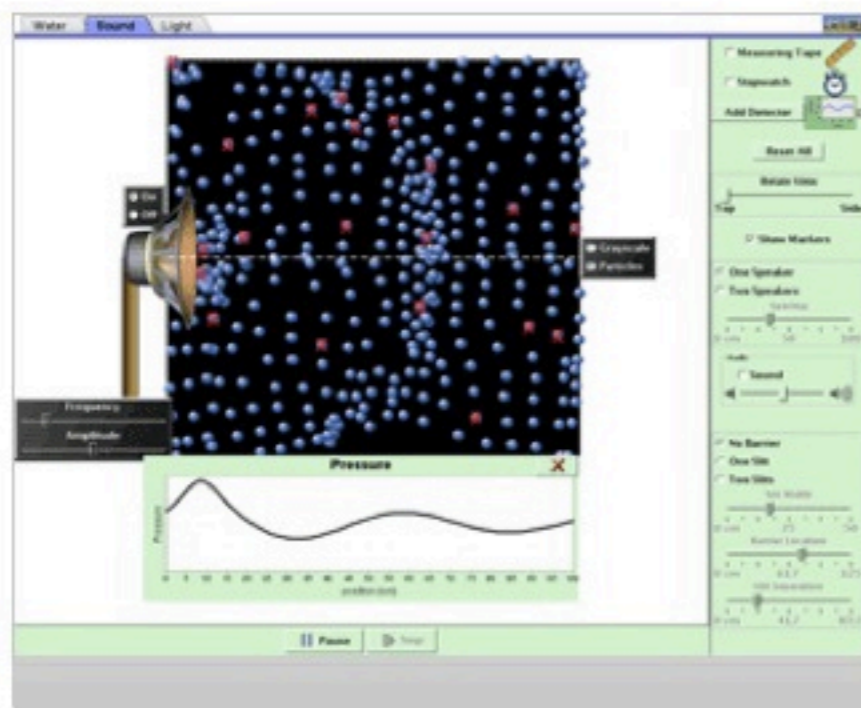
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AI's relativistic adventures





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Interactive Science Simulations

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

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Other languages...

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Excellence Center of Science and Mathematics Education at King Saud University

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How do I use learning technologies in the classroom?

- Intranet site / Ultranet. Students can access from home or at school.
- This is used as the primary store of curriculum & information, as well as complementing texts & practical activities.
- Learning objects used to explain difficult concepts or simulate practical work.
- Learning objects usually mirror practical tasks. Students that miss practical work can complete an online simulation.
- I have used learning objects as the basis of Unit 3 Electronics & Photonics assessment tasks & Light & Matter data analysis task.
- Flash based objects could replace a number of previous programs / pieces of equipment. (Saving money / storage space!!) eg Crocodile Physics, IEC magic boxes.

Problems?

- Flash player versions (often old / locked installations in schools).
- Apple doesn't like Flash - not supported on iPhone or iPad :(
- Usability - something I'm always 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.”

Links & resources

- Flashscience.com
- The Learning Federation
- Al's relativistic adventures
- PhET
- HSC Physics
- Walter Fendt
- The Instructional Use of Learning Objects
- DEECD Ultranet
- Flashkit forums
- Actionscript.org forums

Thanks for coming!

- See you next year.