

# Bright ideas: Sharing physics between universities and high schools

[www.physics.mun.ca/~kris/led.html](http://www.physics.mun.ca/~kris/led.html)

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## QUANTIFYING COLOUR

**Materials:** several colours of light-emitting diodes (with clear packages/lenses)

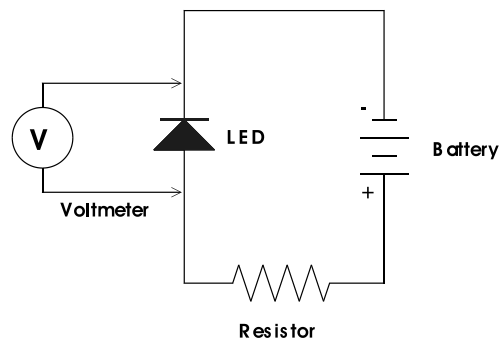
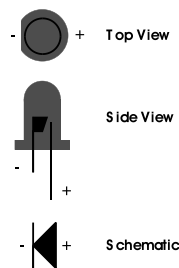
2 “AA” batteries (works best when held in a battery pack)

resistors (50-500 Ohm, can be soldered to LEDs)

multimeter

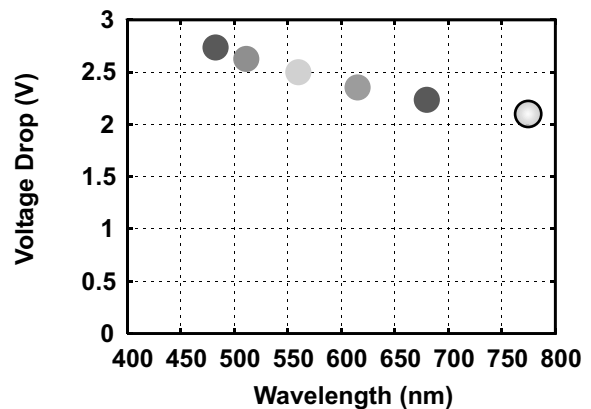
*All items listed can be purchased at stores like Radio Shack, or by mail order through companies like DigiKey Corporation. (1-800-344-4539 or [www.digikey.ca](http://www.digikey.ca)).*

### Setup:



### Analysis:

LED Color	red	yellow-green	blue
Wavelength $\lambda$ (nm)	680	560	480
Voltage $V$ (volts)	2.20	2.49	2.69



### Extension ideas:

**Physics** <http://www.howstuffworks.com/led.htm>  
*More details on how LEDs work*

<http://www.colorado.edu/physics/2000/index.pl>  
*Modern physics, including electromagnetic waves, X-rays, and quantum atoms*

**Astronomy** <http://www.smv.org/jims/unit.htm>  
*Taking temperatures of stars*

[http://www.exploratorium.edu/spectra\\_from\\_space/](http://www.exploratorium.edu/spectra_from_space/)  
*Exploring the universe in different wavelengths*

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## Extensions to other areas of science and technology:

- Biology**     <http://science.howstuffworks.com/eye.htm>  
                  <http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html>  
                  *Converting light energy to chemical energy: vision*
- Chemistry**   <http://www.cc.oulu.fi/~kempmp/colours.html>  
                  *Colours in fireworks*
- Math**           <http://hypertextbook.com/physics/foundations/curve-fitting/>  
                  *Graphing, best-fit lines, extrapolation/interpolation (site under construction)*
- Technology**   <http://ledmuseum.home.att.net/>  
                  *Different kinds of LEDs and their applications*

## Educational Outreach

\* Contact a physics instructor at a nearby university when you have needs or ideas!

\* Educational programs through the Cornell Center for Materials Research

<http://www.ccmr.cornell.edu/education>

Ask a Scientist (online), and descriptions of K-12, community, and teacher activities

Director of Educational Programs: Nevjinder Singhoti, [nev@ccmr.cornell.edu](mailto:nev@ccmr.cornell.edu)

\* Funding for ongoing projects from the Natural Sciences and Engineering Research Council (NSERC)

[http://www.nserc.ca/promoscience/index\\_e.htm](http://www.nserc.ca/promoscience/index_e.htm)

“The PromoScience program aims to encourage organizations creating hands-on learning experiences.”