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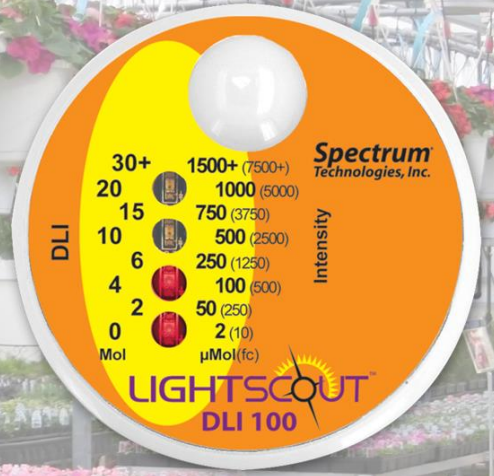
LIGHTSCOUT™

DLI 100 Light Meters



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The LightScout™ DLI 100

- Revolutionary light measurement tool that displays and accumulates PAR light readings (Photosynthetically Active Radiation)
- Accurately measures the amount of accumulated radiation that falls on a specific location over a 24 hour period
- Comes as a set of three units
- Allows light to be measured and compared in multiple places at the same time, without the uncertainty caused by changes in lighting on different days

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Light Intensity versus Cumulative Light

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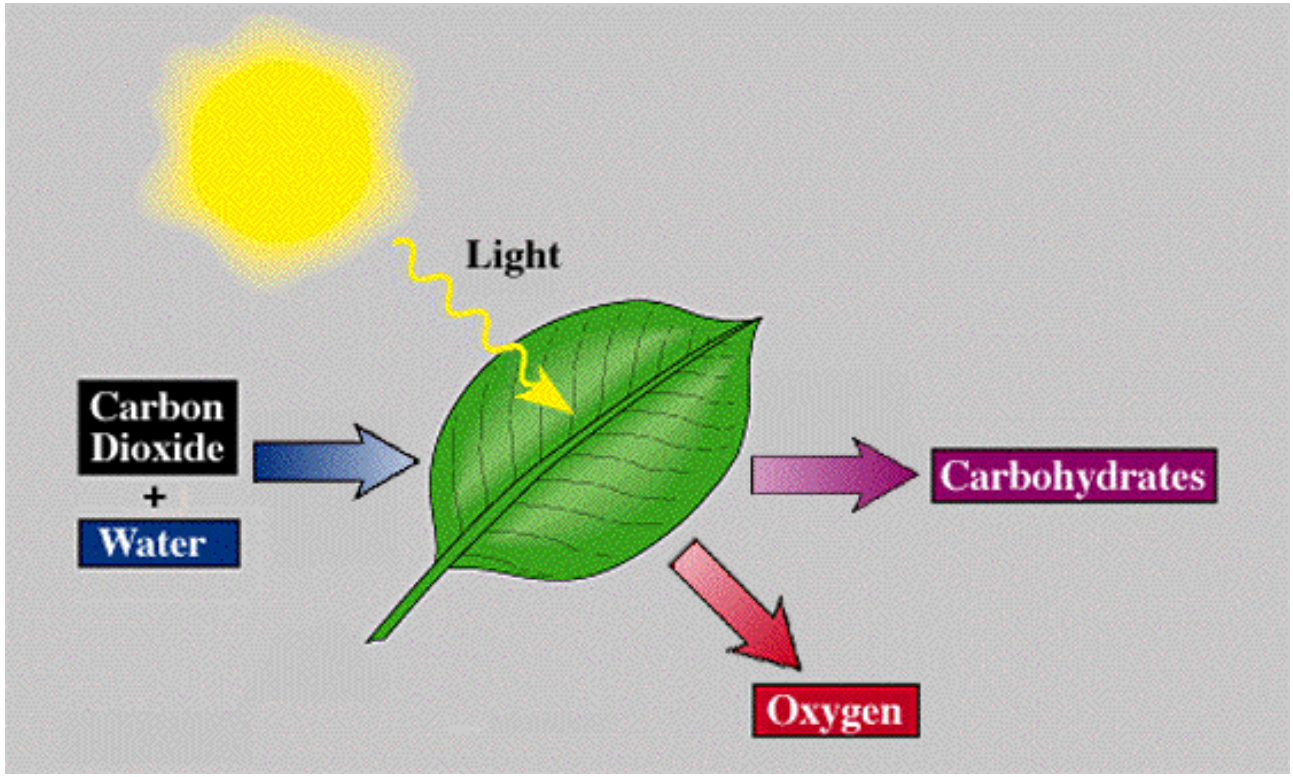
Light Intensity



http://snhs-plin.barry.edu/cell-biology/photo1.gif

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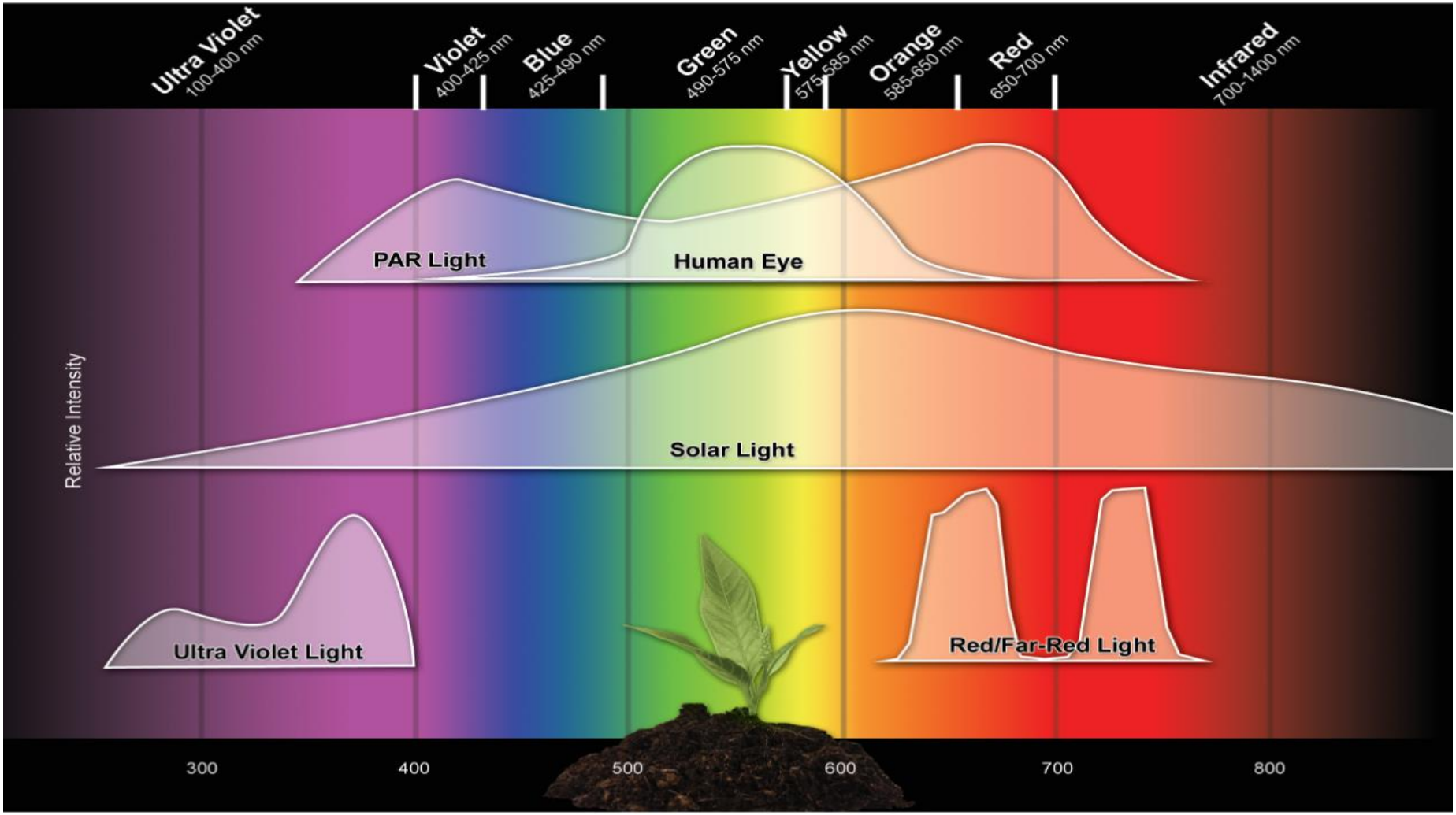
Light Spectrum



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Cumulative Light - DLI

- Although instantaneous light intensity (PAR light) is important for plant development, the **cumulative light** that the plant receives during the course of a day determines their development
- Cumulative light, or Daily Light Integral (DLI), is the measure of the amount light exposure per square meter per day, expressed as mol/m^2d
- DLI quantifies the light available to plants to perform photosynthesis, and is perhaps an even more important metric than PAR light when making growing decisions.

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Daily Light Integral

Example:

On a sunny winter day in the middle latitudes, a plant receives about 9 moles/day. If it is cloudy, the DLI drops to 3 moles/day. In the summer, the DLI for a sunny day is about 26 moles/day and 12 moles/day for a cloudy day.

Each type of plant has a different DLI range for optimal growth. DLI is directly correlated with plant quality, and a minimum amount of light is required for marketable plants. Measuring DLI over a growing season and comparing it to results can help a grower decide which varieties work for his or her

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Daily Light Integral

GENERALIZED PLANT RESPONSES TO DIFFERENT LIGHT LEVELS

Relative Light Level	DLI - Daily Light Integral	Light Intensity* at Noon	Generalized Plant Growth Response
Very Low	2 to 5	100 to 200 (500 to 1,000 fc)	Poor quality
Low	5 to 10	200 to 400 (1,000 to 2,000 fc)	Minimum acceptable quality
Medium	10 to 20	400 to 800 (2,000 to 4,000 fc)	Good quality
High	20 to 30	800 to 1,200 (4,000 to 6,000 fc)	Excellent quality
Very High (outdoors)	30 to 60	1,200 to 2,000 (6,000 to 10,000 fc)	Excellent quality

* Micromoles ($\mu mol/m^2$ s)
fc = foot candles

Note: It is not possible to make a direct conversion between an instantaneous light measurement and the Daily Light Integral. Also, temperature is a key factor in plant quality and growth. Source: Hamrick, Debbie, ed. Ball Red Book. Batavia, IL: Ball Publishing, 2003.

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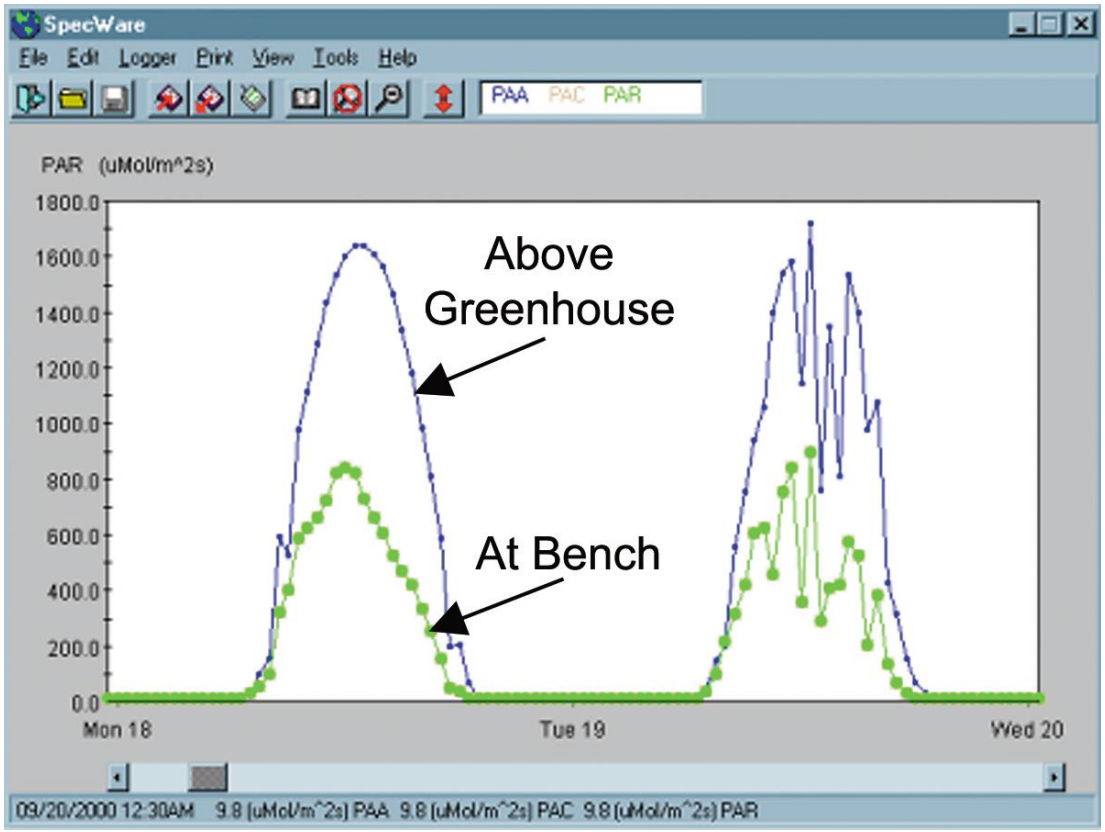
Light Variations

Outside Light vs. At The Bench

Glazing and greenhouse materials can cause light transmission to vary from 50-90%. Using 2 light sensors, one on the outside of the greenhouse and another at the bench, will allow you to calculate and track light transmission.



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Where to Measure Light

- Use a “control” to compare maximum light available
- In the Crop Canopy
- In a Greenhouse
- Shaded Tees and Greens; Stadiums (turf)
- Other applications

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DLI 100 Operation

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DLI 100 Features

- Simple, one-button operation
- Light sensor measures PAR light (Photosynthetically Active Radiation)
- LEDs display light intensity in µmol/m^{2}s or foot candles every 4 seconds for 24 hours
- Accumulates light measurements during this 24 hour period in order to display Daily Light Integral (DLI)
- Replaceable, 3V Lithium CR2032 battery will record for 60 days

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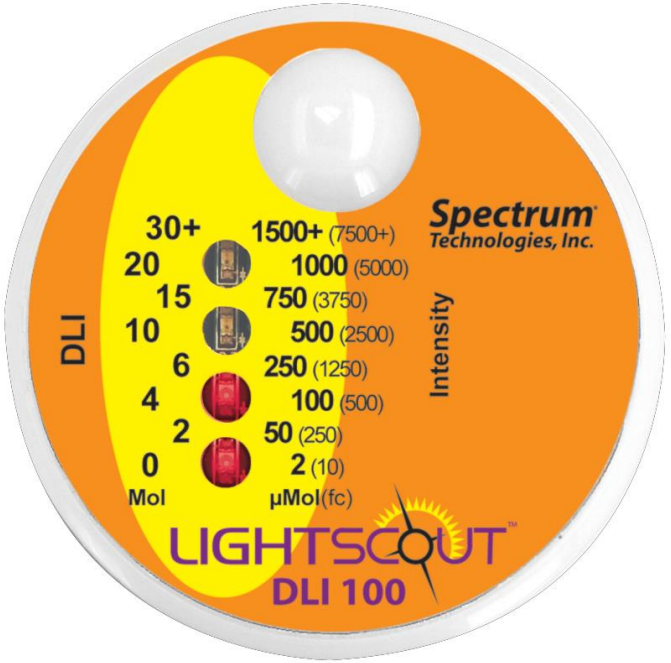
DLI 100 Modes of Operation

- Light Gathering Mode (24 hours)
  - LEDs display current light intensity in µmol/m^2s or foot candles every 4 seconds for 24 hours
- DLI Display Mode (1 hour)
  - LEDs display accumulated light (DLI) from the past 24 hours. DLI value will flash every second.
- Unit turns off after 25 hours but retains DLI value. Unit will display stored DLI for 10 seconds when turned back on.



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How To Read The Display

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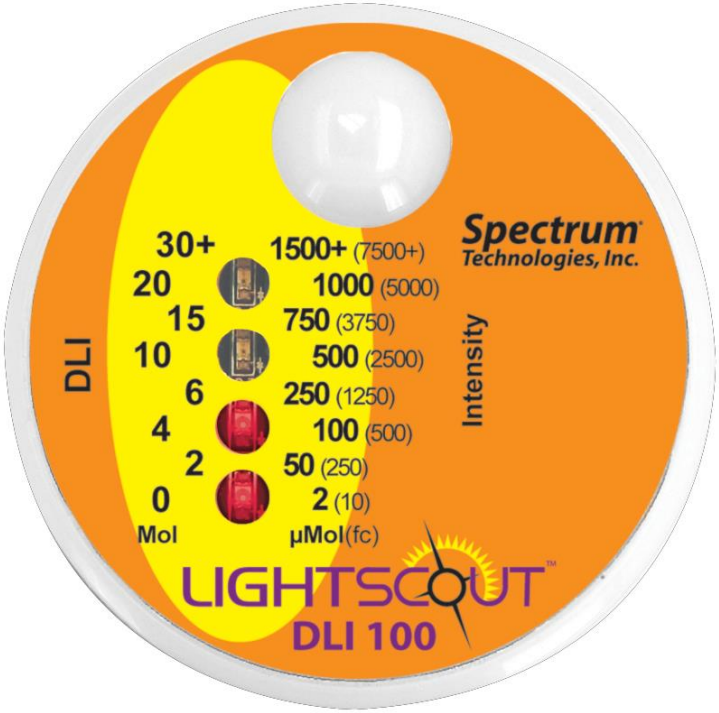
How To Read The Display

- 4 LEDs are used to indicate different levels of light intensity
- Numbers to the right are used during Light Gathering Period to indicate current light levels (µmol/m^2s or fc)
- Numbers to the left of the LEDs are used to display DLI value in mol/m^2d
- The light level that is displayed is <u>at least</u> the number indicated, but below the next number up
- Either one, two, or four LEDS will be illuminated



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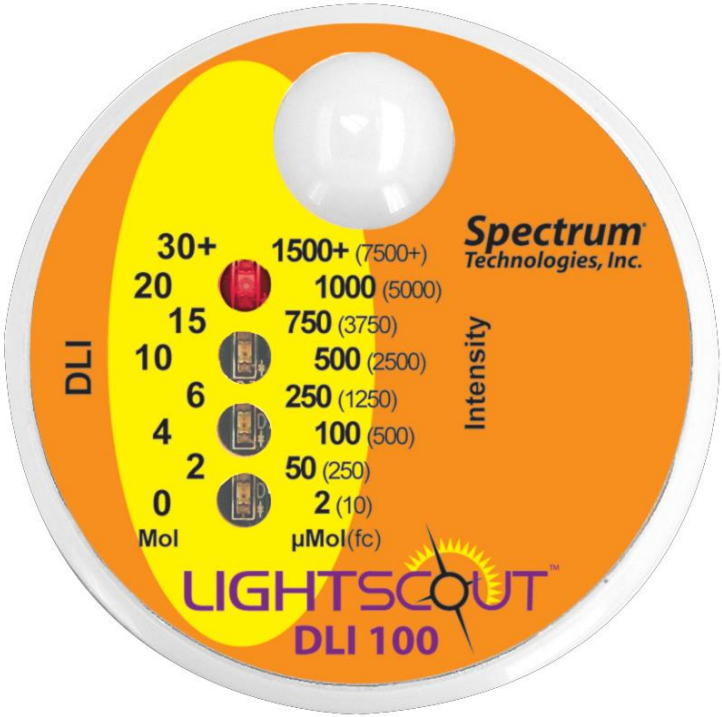
How To Read The Display

- **One LED**
  - Read the number next to it; the light level will be at least that number
  - DLI value would be in the range of 20-29 in the example to the right.



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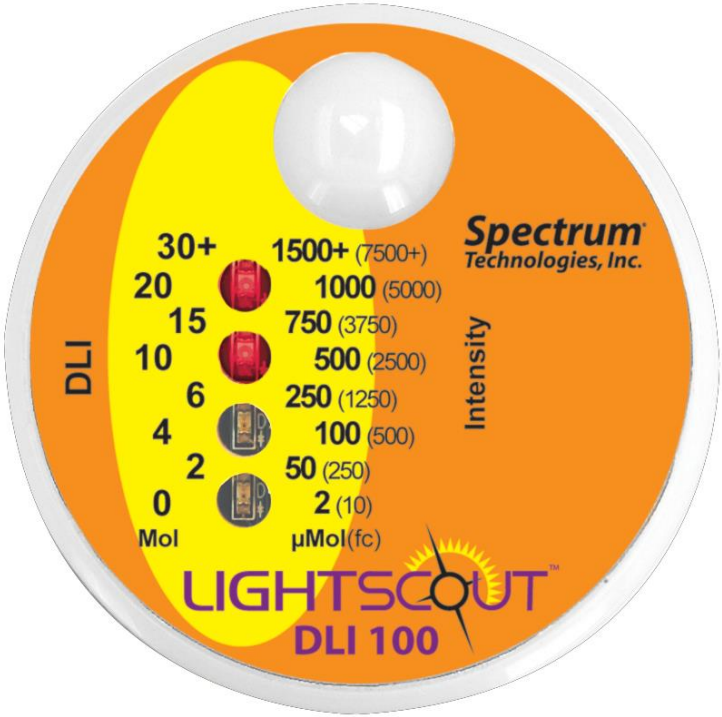
How To Read The Display

- **Two LEDs**
  - If the light level is between two LEDs, then both flash
  - In this case, use the number between them
  - Current light level would be in the range 750 to 999 µmol/m^{2}s in this example



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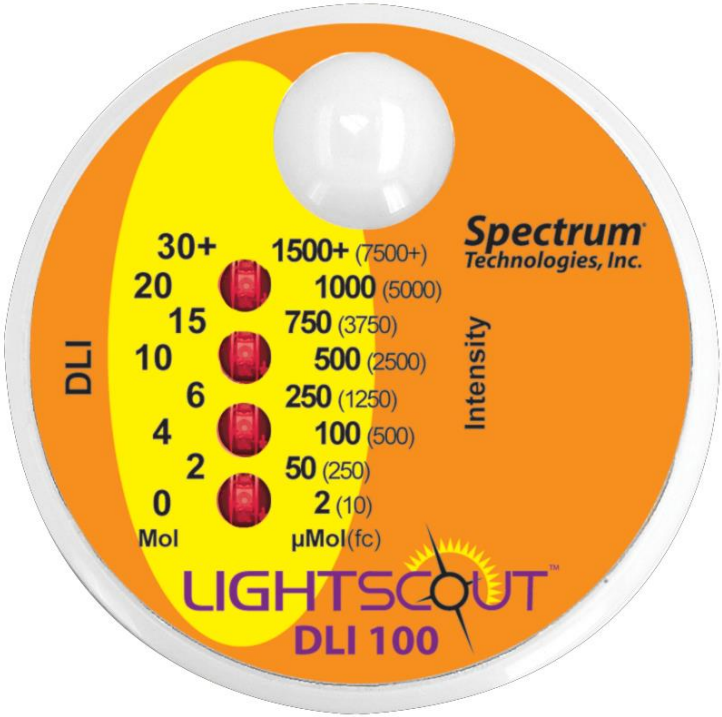
How To Read The Display

- **Four LEDs**
  - Under the highest light levels, all four LEDs flash
  - Measured DLI, or current light value, is at least the value indicated at the top of the display (30+ for DLI, or 1500+ / 7500+ for current light value)



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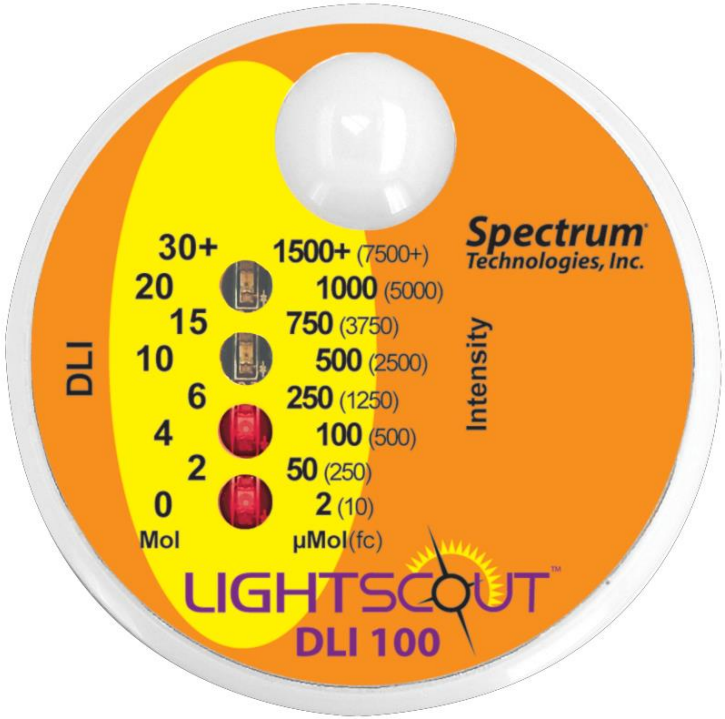
How To Read The Display

	DLI	Light Gathering	
	$mol \cdot m^{-2} \cdot d^{-1}$	$\mu mol \cdot m^{-2} \cdot s^{-1}$	(fc)
	(30+)	(1500+)	(7500+)
	(20)-29	(1000)-1499	(5000)-7499
	(15)-19	(750)-999	(3750)-4999
	(10)-14	(500)-749	(2500)-3749
	(6)-9	(250)-499	(1250)-2499
	(4)-5	(100)-249	(500)-1249
	(2)-3	(50)-99	(250)-499
	(0)-1	(2)-49	(10)-249



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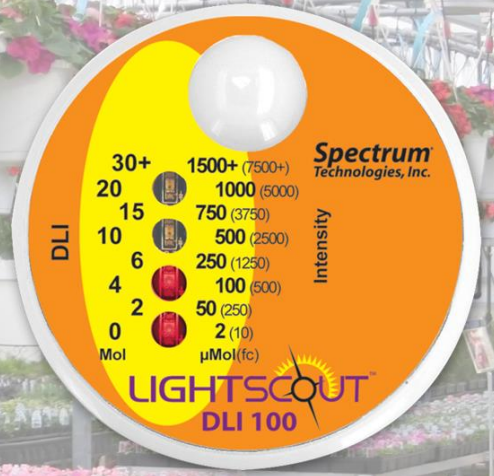

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