

Electromagnetic Spectrum and Multi-wavelength Astronomy

Curriculum Materials: Quantities and Suggested Vendors

Qty Item	description	Suggested Vendor
Days 1-2 (and Days 7-8)		
~ 2" square per group	GAM #850 Blue Gel GAM	<p>There is an online form to request a quote; an order can be placed after customer service responds to the query: https://us.rosco.com/en/product/gamcolor Click on "Request a Quote"</p> <p>There are 3 sizes offered in dialog box to choose from. Use Additional Comments dialog box to note the 3 GAM colors for the order: GAM 250, GAM 650, and GAM 850.</p>
~ 2" square per group	GAM #650 Green Gel GAM	
~ 2" square per group	GAM #250 Red Gel GAM	
1 per group	5 mm DIFFUSED Red LED Light Emitting Diode	Adafruit, Amazon, others Note: DIFFUSED LEDs have colored lenses.
1 per group	5 mm DIFFUSED Green LED Light Emitting Diode	Adafruit, Amazon others. Note: DIFFUSED LEDs have colored lenses.
1 per group	5 mm DIFFUSED Blue LED Light Emitting Diode	Adafruit, Amazon others. Note: DIFFUSED LEDs have colored lenses.
1 per group	5 mm DIFFUSED White LED Light Emitting Diode	Adafruit, Amazon others. Note: DIFFUSED LEDs have colored lenses.
1 per student	CR 2032 Coin Battery	Amazon, many other vendors
Day 3		
1 per demo or group	Infrared Camera (e.g.-SEEK IR compact camera; FLIR IR Camera Thermal)	Grainger, Amazon, others
1 optional for IR image projection	Chromecast or other streaming device to stream images from smart phone to projector, or smart screen	Google, Amazon, Samsung, Roku, others
1 small square	1/8 thick Plexiglass	TAP Plastics online store, Professional Plastics online store; "acrylic sign holders", Amazon, others
1 small square	Black garbage bag plastic	Self-supplied

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Days 4 -5		
1 per group	Mini-Guitar Amp (3 Watt, Battery Powered Amp for Guitar; Amp High Sensitivity w/Volume Control	Amazon, Walmart, AliExpress, Guitar Center, DH Gate (Andoer, Jili Brands) (higher watt amps may also be used)
1 per group	9-volt battery	Amazon, many other vendors
1 per group	Mini-panel 3-300 solar cell Minimum 1.75" X 3", 0.5V, 300mA	Solar Made, Home Science Tools
2 leads per group	Short wire test leads with alligator clips	Adafruit, Amazon, others
One half per group (pin X bare wire)	5 mm Audio Cable 16AWG (Hosa CSS-103 Balanced Interconnect Cable - 1/4-inch TRS Male or equivalent) Cut a pin x pin cable in half; strip ends to expose wires.	Hosatech, BH PhotoVideo, Amazon, Sweetwater
1 for demo, optional per group	Camp fan, hand held mini-fan	Walmart, Amazon, REI
1 per group	Remote Control (IR)	Self-supplied
1 demo*	Overhead projector, Holographic Grating 1000 lines/ mm and black construction paper OR Slide projector, Holographic Grating 1000 lines/ mm and make a slit slide	Self-supplied (can be found used at low or no cost) Self-supplied (can be found used at low or no cost)
1 piece (~5" x 5")	Holographic Grating 1000 lines/mm sheet	Rainbow Symphony, Arbor Scientific, Amazon
2 Sheets	black construction paper for overhead projector OR construct slit slide for slide projector	Office supply stores, online stores
Optional Transmitter circuit (See below for parts)		

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1 for demo	IR LED 16mW minimum output, wavelength 940 nm Digi-Key (LTE- 209 160-1928-ND)	Digi-Key, Adafruit
1 for demo	0.22 micro-farad Capacitor 50 WVDC	Digi-Key
1 for demo	AA Battery Holder	Digi-Key, Amazon, many other vendors
1 for demo	AA Battery	Amazon, many other vendors
1 for demo	Audio cable, 3.55 mm/ 1/8" pin X bare wire for transmitter circuit. Mono or stereo. Cut a pin X pin cable in half, strip ends to expose wires.	Digi-Key, Amazon, many other vendors Sound source, smart phone, laptop, transistor radio
Days 7-8		
1 for demo	Rheostat dimmer electrical cord	Home Depot, Lowe's, Amazon
1 for demo	CFL (best if globe shape)	Home Depot, Lowe's, Bed Bath & Beyond
1 for demo	Clear globe incandescent bulb	Target, Home Depot, Ace Hardware, 1000sBulbs, others
1 per student	Spectroscope Option: Construct Cereal Box Spectroscopes using Holographic Grating 1000 lines/mm slides Option: purchase spectroscopes, \$3 and \$10 versions available online	Rainbow Symphony, Arbor Scientific, Amazon Arbor Scientific, Home Scientific, Fischer Scientific, others

* Overhead Projector set up for EM spectrum projection using black construction paper: Slit can be adjusted for best projection of visible and IR radiation. Recommended width is approximately 2.5 cm. Slide Projector set up for EM spectrum projection is similar, with a slit slide used in the projector carousel or tray, and the holographic grating on the lens.