Electronic spectroscopy of molecular iodine vapor has long been studied in undergraduate physical chemistry teaching laboratories, but the effectiveness of emission work has typically been limited by availability of instrumentation. This talk shows how to make inexpensive green diode-pumped solid-state (DPSS) lasers easily tunable for efficient, selective excitation of I$_2$. Miniature fiber-optic spectrometers then enable rotationally resolved fluorescence spectroscopy up to $v'' = 42$ near 900 nm with acquisition times of less than one minute. DPSS lasers are also versatile excitation sources for vibrational Raman spectroscopy, which is another common exercise that has been limited by lack of proper instrumentation in the teaching laboratory. This talk shows how to construct a simple accessory for commercial fluorimeters to record vibrational Raman spectra and depolarization ratios for CCl$_4$ and C$_2$Cl$_4$ as part of a lab exercise featuring molecular symmetry.