

Station Card: Spectral Lines Lab

Kirchhoff modes + element fingerprints

Dr. Anna Rosen

Name: _____ Section: _____

Date: _____

Station: _____ Group members: _____

Goal: Use the demo to make a claim supported by (1) at least one number/readout and (2) at least one sanity check.

Demo: /demos/spectral-lines-lab/

Artifact: a “spectrum ID” card (setup + elements + evidence).

- 1) **Kirchhoff setup:** Which setup makes **absorption** lines? Write your prediction first, then test it.
- 2) Turn on **Unknown Spectrum**.
- 3) Choose element cards until you get a strong match.
- 4) Record:
 - setup type (continuous/emission/absorption),
 - the elements you think are present,
 - at least **two** line wavelengths (nm) you used as evidence.
- 5) Write one sentence:
 - “I think the unknown contains _____ because the line pattern matches at _____ nm and _____ nm.”

Word bank + sanity checks

Word bank: - **Continuous spectrum:** smooth light at all wavelengths (hot, dense source).
- **Emission lines:** bright lines at specific wavelengths (hot, thin gas). - **Absorption lines:** dark dips at specific wavelengths (cool gas in front of a continuum). - **Fingerprint:** a pattern of line positions.

Sanity checks: - The same element has emission and absorption at the **same wavelengths**

(only contrast flips). - “Instrument resolution” makes lines wider — real spectrographs do not produce infinitely thin lines.