

Title: Emission and Absorption Spectra

Absorption Spectroscopy Site

Emission Spectroscopy site

Line Spectroscopy Site

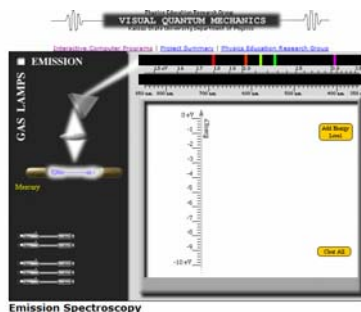
Purpose:

- To observe the absorption and emission spectra of selected elements

Procedure:

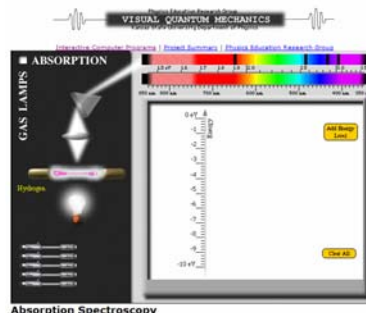
Activity 1

- Go to the Absorption Spectra Site
<http://phys.educ.ksu.edu/vqm/html/absorption.html>
- Follow the directions for
 - observing the actual spectrum of a gas.
 - creating and manipulating energy levels.
 - creating transitions between energy levels.
 - matching trial spectral lines to those of the actual spectrum
 - identifying an unknown gas
- Record your results in Data Table 1



Activity 2:

- Go to the Emission Spectra Site
<http://phys.educ.ksu.edu/vqm/html/emission.html>
- Follow the directions for
 - observing the actual spectrum of a gas
 - creating and manipulating energy levels
 - creating transitions between energy levels
 - matching trial spectral lines to those of the actual spectrum
 - identifying an unknown gas
- Record your results in Data Table 2



Activity 3

- Go to Line Spectra Site
<http://webmineral.com/help/FlameTest.shtml>
- Record the following data for the elements listed in Data Table 3.
 - flame test color
 - approximate numbers of lines of each color
- Click the Flame Spectrum Pop-Up button.
 - Compare the flame and spark emission spectra.
 - Record in Data Table 3.

| Color | Shade or Tone | Element | Remarks |
|-------|---------------------|---------|---|
| Red | Crimson | Li | The lithium minerals, which are either silicates or phosphates, do not become alkaline after ignition. Compare Strontium. |
| Red | Crimson | Sr | Carbonates and sulfates show the strontium reaction, and become alkaline after ignition. Silicates and phosphates do not give the strontium flame. |
| Red | Yellowish to orange | Ca | Only a few minerals give this calcium color decisively when heated alone. Often, however, the color shows distinctly after moistening the assay with hydrochloric acid. |

Results:

| Data Table 1: Absorption Spectra for Selected Elements | | | | | | |
|--|-----------------------------|------|-------|--------|--------|-----|
| Element | Approximate Number of Lines | | | | | |
| | violet | blue | green | yellow | orange | red |
| hydrogen | | | | | | |
| helium | | | | | | |
| mercury | | | | | | |
| lithium | | | | | | |
| neon | | | | | | |
| unknown = | | | | | | |

| Data Table 2: Emission Spectra for Selected Elements | | | | | | |
|--|-----------------------------|------|-------|--------|--------|-----|
| Element | Approximate Number of Lines | | | | | |
| | violet | blue | green | yellow | orange | red |
| hydrogen | | | | | | |
| helium | | | | | | |
| mercury | | | | | | |
| lithium | | | | | | |
| neon | | | | | | |
| unknown = | | | | | | |

Data Table 3: Absorption Spectra for Selected Elements

| Element | Flame Test Color | Approximate Number of Lines | | | | | | Flame and Spark Spectra |
|---------|------------------|-----------------------------|------|-------|--------|--------|-----|-------------------------|
| | | violet | blue | green | yellow | orange | red | same or different ? |
| Li | | | | | | | | |
| Sr | | | | | | | | |
| Ca | | | | | | | | |
| Na | | | | | | | | |
| Ba | | | | | | | | |
| Mo | | | | | | | | |
| B | | | | | | | | |
| Tl | | | | | | | | |
| P | | | | | | | | |
| Zn | | | | | | | | |
| Te | | | | | | | | |
| Sb | | | | | | | | |
| Pb | | | | | | | | |
| Cu | | | | | | | | |
| Se | | | | | | | | |
| In | | | | | | | | |
| As | | | | | | | | |
| K | | | | | | | | |
| Rb | | | | | | | | |
| Cs | | | | | | | | |

Discussion:

1. Summarize what you did.
2. Compare and contrast the emission and absorption spectra for hydrogen, helium, mercury, lithium, neon.
3. Describe what happens to the spectra when you
 - a. create and manipulate energy levels.
 - b. create transitions between energy levels.
4. How successful were you in matching trial spectral lines to those of the actual spectrum?
5. Describe any patterns in spectral lines that you noted.

Conclusion:

A brief testable statement about emission and absorption lines, based on your data

Reflection:

personal statement