

## **APPENDICES**

### **TOPIC 2: ATOMIC STRUCTURE**



## Appendix 1: Spectral Lines

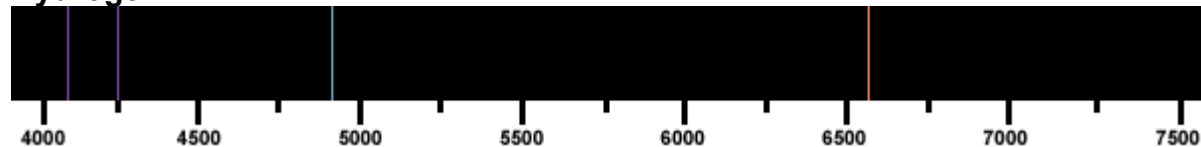
Element	Wavelength (nm)	Colour
Barium	659.5	Red
	614.1	Orange
	585.4	Yellow
	577.7	Yellow
	553.5	Green (strong)
	455.4	Blue (strong)
Calcium	445.4	Blue
	443.4	Blue-violet
	442.6	Violet (strong)
	396.8	Violet (strong)
	393.3	Violet (strong)
Chromium	520.8	Green
	520.6	Green
	520.4	Green
	428.9	Violet (strong)
	427.4	Violet (strong)
	425.4	Violet (strong)
Copper	521.8	Green
	515.3	Green
	510.5	Green
Hydrogen	656.2	Red
	486.1	Green
	434.0	Blue-violet
	410.1	Violet
Helium	706.5	Red
	667.8	Red
	587.5	Orange (strong)
	501.5	Green
	471.3	Blue
	388.8	Violet (strong)
Potassium	404.7	Violet (strong)
	404.4	Violet (strong)

Appendix 1: Grade 12 Chemistry Topic 2 Atomic Structure C12-2-02

Element	Wavelength (nm)	Colour
Mercury	623.4	Red
	579.0	Yellow (strong)
	576.9	Yellow (strong)
	546.0	Green (strong)
	435.8	Blue-violet
	*Many lines in the violet and ultraviolet	
Lithium	670.7	Red (strong)
	610.3	Orange
	460.3	Violet
Sodium	589.5	Yellow (strong)
	588.9	Yellow (strong)
	568.8	Green
	568.2	Green
Neon	Many lines in the red	
	640.2	Orange
	585.2	Yellow
	540.0	Green
Strontium	496.2	Blue-green
	487.2	Blue
	483.2	Blue
	460.7	Blue (strong)
	430.5	Blue-violet
	421.5	Violet
	407.7	Violet

## Appendix 2: GAS DISCHARGE TUBES (BLM)

### Hydrogen



Emission Spectrum of Hydrogen

Element \_\_\_\_\_

Element \_\_\_\_\_

Element \_\_\_\_\_

Element \_\_\_\_\_

Element \_\_\_\_\_

Element \_\_\_\_\_

### Appendix 3: Observing Continuous Spectra and Line Spectra

Sample answers will be included at a later date.

Questions:

1. Draw the spectra of an incandescent light bulb and of a fluorescent light bulb.
2. What's the difference between a line spectrum and a continuous spectrum? Draw one of each.
3. Based on your observations in the lab activity, what types of materials produce continuous spectra? Line spectra?
4. Give an example of a light source with
  - a) a continuous spectrum
  - b) a line spectrum
  - c) both a continuous and a line spectra
5. Based on your observations, what would you say are some things that all light emitting sources have in common? How can they differ?
6. Explain why a rainbow is considered to be an example of a continuous spectrum.
7. What do the different colours in a line spectrum represent?
8. Why do different substances show different spectra?
9. Sodium vapour lamps emit a characteristic yellow light. What can you assume about sodium atoms, based on this observation?
10. Explain how atoms produce their characteristic spectral lines. Why are there different lines produced instead of just a single line?
11. Which elements produced the largest number of spectral lines? What does this suggest about electron transitions?
12. Spectral lines are fingerprints of elements. Explain what is meant by this statement.



## Appendix 6: Electronegativities (BLM)

Use the table of electronegativities to determine the bond type (ionic, polar covalent, non-polar covalent) that would be formed between each of the following elements. Provide the electronegativity difference for each pair.

	<u>Bond Type</u>	<u>Electronegativity Difference</u>
1. Na, Cl		
2. Al, Cl		
3. H, S		
4. K, F		
5. O, O		
6. Mg, S		
7. Li, Br		
8. F, F		

## Electronegativities (BLM) KEY

Use the table of electronegativities to determine the bond type (ionic, polar covalent, nonpolar covalent) that would be formed between each of the following elements. Provide the electronegativity difference for each pair. Answers are based on Allred-Rochow table.

	<b>Bond Type</b>	<b>Electronegativity Difference</b>
1. Na, Cl	ionic	$2.83 - 1.01 = 1.72$
2. Al, Cl	polar covalent	$2.83 - 1.47 = 1.36$
3. H, S	ionic	$2.44 - 2.20 = 2.24$
4. K, F	ionic	$4.10 - 0.91 = 3.19$
5. O, O	non-polar covalent	$3.50 - 3.50 = 0$
6. Mg, S	polar covalent	$2.44 - 1.23 = 1.21$
7. Li, Br	ionic	$2.74 - 0.97 = 1.77$
8. F, F	non-polar covalent	$4.10 - 4.10 = 0$

