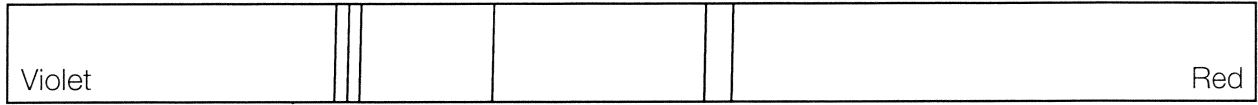


Name: _____

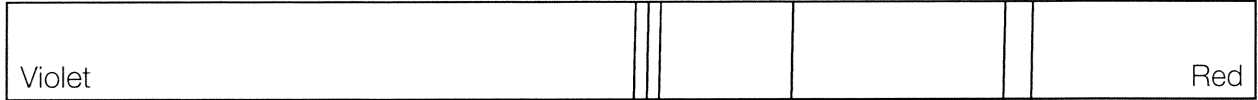
Period: _____

Comparing Galactic Spectra

Here is the laboratory (standard) spectrum for a particular element.



Here is the spectrum from a distant galaxy which contains that same element.



- Describe how these two spectra differ from each other?

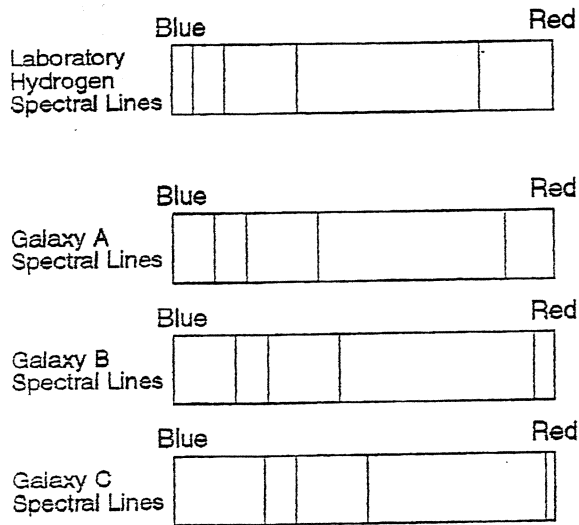
- This galaxy's spectrum would be described as (circle one) **red-shifted** **blue-shifted**
- What does a red-shifted spectrum tell you about the object? _____
- What does a blue-shifted spectrum tell you about the object? _____
- What is the difference between an object with a slightly shifted spectrum and one with a drastically shifted spectrum?

- How would you describe the spectra of virtually all observable objects in the Universe?

- Explain how this observation supports the Big Bang theory.

Standard Spectrum		Determine if the galaxy is approaching or receding based on its spectral lines. Circle your answer.
Galaxy #1		<input type="checkbox"/> APPROACHING <input type="checkbox"/> RECEDING
Galaxy #2		<input type="checkbox"/> APPROACHING <input type="checkbox"/> RECEDING
Galaxy #3		<input type="checkbox"/> APPROACHING <input type="checkbox"/> RECEDING

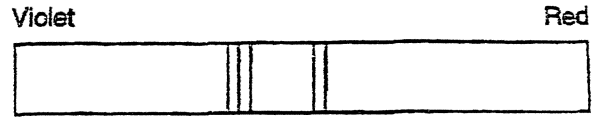
1. In the diagram below, the spectral lines of hydrogen gas from three galaxies, *A*, *B*, and *C*, are compared to the spectral lines of hydrogen gas observed in a laboratory.



What is the best inference that can be made concerning the movement of galaxies *A*, *B*, and *C*?

- 1) Galaxy *B* is moving away from Earth, but galaxies *A* and *C* are moving toward Earth.
- 2) Galaxies *A*, *B*, and *C* are all moving toward Earth.
- 3) Galaxy *A* is moving away from Earth, but galaxies *B* and *C* are moving toward Earth.
- 4) Galaxies *A*, *B*, and *C* are all moving away from Earth.

2. The diagram below represents a standard dark-line spectrum for an element.

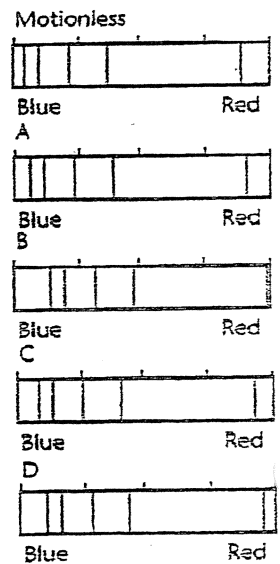


The spectral lines of this element are observed in light from a distant galaxy. Which diagram represents these spectral lines?

- 1)
- 2)
- 3)
- 4)

Based on the spectrums in the figure, rank the four galaxies in order of the speed with which they are moving away from Earth, from slowest (1) to fastest (4).

	Rank (1 = slowest, 4 = fastest)
Galaxy A	
Galaxy B	
Galaxy C	
Galaxy D	



Based on Hubble's Law, which of the galaxies is farthest from Earth?

2. Are any of the galaxies moving toward Earth? Explain.