

Redshift / Blueshift HO

NAME _____

Station 1: Historic Galaxy Spectra

Read the article describing how to interpret the spectra images. Once you have done so, please use the spectra images to answer the questions below.

1. Explain what astronomers measure in each spectra to determine the direction and speed of the galaxy.
2. Given your knowledge of the images, which colors of the rainbow must be on the left and right sides of the spectra?
3. As galaxies have more and more redshift, how would you expect their velocities to change?
4. The top galaxy spectrum is quite thick and they get progressively thinner as you go down the page. What do you think is the cause of the different galaxy spectra thicknesses?

Station 2: Calculating the Velocities of Galaxies

Use the spectra and instructions at the station handout to fill out the table below and calculate how fast these galaxies are moving **and** which direction they are moving.

Galaxy Spectral Shift Table				
Galaxy	Hydrogen Spectral Line Location (nm)	Wavelength Shift (nm)	Velocity (km/s)	Direction (Away or Closer)
Virgo A				
M65 Spiral in Leo				
Andromeda				
Human Eye	1 nm	1 nm		---

Station 3: Redshifting Galaxies from Universe Expansion

Galaxy	Redshift (km/s)	Distance (Mpc)	Distance in lightyears
A	2500		
B	13500		
C	3900		
D	7400		
E	9600		

Step 3: How far does an object need to be in order for Universal Expansion to be visible to the human eye?

Step 4: Can we use telescopes to see stars affected by Universal Expansion?

Station 4: Finding Exo-planets through Redshift - Blueshift

After reading the article online, please work together as a small group to answer the questions below.

1. What causes the redshift and blueshift in the radial velocity method?
2. What is an exoplanet?
3. What are two advantages of the Radial Velocity Method?
4. Using the blue graph, what do you think is the Period of the 51 Pegasi exoplanet?
5. What are two disadvantages of the Radial Velocity Method?