





Activity Two: Classifying and Identifying

Part One: Using one of the three cameras (A, B, or C) of the Hubble Deep Field image, classify the objects according to their shape and color. For example, if object number 4 is blue and round, place a number 4 in the box where the blue row and round column intersect.

Classification chart for Hubble Deep Field section:

					Irregular
Blue					
White					
Yellow					
Red					

Classifying and Identifying Objects



Stars: Stars are massive, gaseous bodies that undergo nuclear reactions and emit light. Stars do not really have spikes, even though they appear that way in the Hubble Deep Field. These spikes are caused by scattered light within the telescope's optical assembly.



Spiral Galaxies: Spiral galaxies have two or more "arms" winding out from a central disk. When viewed from the side, a spiral galaxy resembles a fried egg. Some of the long, narrow objects in the Hubble Deep Field may be side views of spiral galaxies. The spirals in the Hubble Deep Field are mostly blue and white because of recent star formation, particularly in the spiral arms.



Elliptical Galaxies: Elliptical galaxies come in a variety of shapes ranging from round to flattened. Elliptical galaxies have a smooth, featureless appearance and appear basically the same from any angle. Most of the elliptical galaxies in the Hubble Deep Field are yellow and red because they do not contain young stars.

Irregular Galaxies: Irregular galaxies have stars, dust, and gas scattered in random patches. The irregular galaxies in the Hubble Deep Field tend to have a blue or white color because recent star formation makes galaxies appear bluer.

About Galaxies

Galaxies: Galaxies are massive systems made of billions of stars, dust and gas clouds held together by gravity.

Stars: Stars are massive, gaseous bodies that undergo nuclear reactions and emit light. Stars do not really have spikes, even though they appear that way in the Hubble Deep Field. These spikes are caused by scattered light within the telescope's optical assembly.

Galaxy Shape: Astronomers use shape to classify galaxies. There are three commonly recognized shapes: spiral, elliptical and irregular. Spiral galaxies have two or more "arms" winding out from a central disk. When viewed from the side, spiral galaxies look like a fried egg. Elliptical galaxies have a smooth and featureless appearance, and are either round or oval in shape. They appear basically the same when viewed from any angle. Irregular galaxies do not have arms or a uniform appearance. Their stars and gas clouds are scattered in random patches. The most difficult part about identifying galaxies by their shape is being able to recognize them when their orientation is unknown.

Galaxy Color: Galaxies come in a variety of colors. As a galaxy ages, its color changes. Galaxies with young stars appear blue, while galaxies with old stars appear red. Galaxies with stars of varying ages may appear to be a combination of colors. For example, a galaxy with some old and young stars may appear to be a combination of blue and red. The presence of dust in a galaxy can make it appear more red than it actually is. By studying the light from a galaxy, astronomers can also get information about its chemical composition, its distance from Earth, and the speed at which it is traveling away from us.

Galaxy Size/Distance: Determining an object's distance from Earth is a difficult task for astronomers. The size of a galaxy is not useful because objects that are large can appear close next to objects that appear smaller but are extremely large and far away. Astronomers study the light from galaxies to determine their distance, measured in light-years. A light-year is equal to the distance light can travel in a year, approximately 6 trillion miles (a six with 12 zeros).

Galaxy Population: Astronomers have long tried to estimate the number of galaxies in the universe. They use a method called "representative sampling." To obtain their estimate, they first divide the sky into sections of equal size. Astronomers then count the number of galaxies in one section. The count from that one section is then multiplied by the total number of sections in the sky. Astronomers have estimated the number of galaxies in the universe to be between 50 and 100 billion.