Chapter 16: Build a Galaxy

Student Worksheet

Objective:

Use a Milky Way Galaxy model to demonstrate knowledge of *galactic structure*, *galaxy types*, and *star forming regions*.

Engage:

Imagine being asked to draw a picture of yourself without ever having looked in a mirror. You would be well equipped to draw pictures of others, but there would be a great deal of *you* that you would be unable to render. This predicament is quite similar to the one galactic astronomers face when trying to study the Milky Way. Telescopes have a great view of our extragalactic neighbors, but we cannot zoom out for a bird's eye view of ourselves. Despite the setbacks, astronomers have come to learn quite a bit about our home galaxy by comparing what we know about the Milky Way to what we know about other galaxies and then making inferences.

Think back to the self-portrait problem. In the space below make a list of techniques you could use to draw parts of yourself you cannot see.

Introduction:

The Milky Way galaxy is a barred spiral galaxy with a diameter of about 100,000 light years. Spiral galaxies are big, flat discs with a bulge in the center. The Sun is located about 26,000 light years from the center of the galaxy. The center of the galaxy has a bulge that is full of tightly bound stars and home to a supermassive black hole. Our galaxy has spiral arms extending from the bulge. Stars form in the spiral arms, while older redder stars are located between the spiral arms.

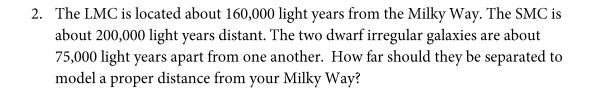
Your Task:

- Using two paper discs, glue, glitter of a variety of colors, and cotton balls make a model of our galaxy based on the information above.
- Mark the location of our Sun.

- Use red glitter to show old stars, use blue glitter to show young stars, use silver and gold glitter to show yellow and white stars.
- Use cotton to show the bulge and the spiral arms. Feel free to pull the cotton balls apart into strands.
- Make your galaxy 2-sided. Wait until one side dries before attaching the halves of the galaxy.

Conclusion:

1.	People in the Southern Hemisphere can see two of our satellite galaxies clearly—
	the Large and Small Magellanic Clouds (LMC and SMC). These are irregular
	galaxies with diameters of 14,000 and 7,000 light years respectively. How could
	you model these galaxies? Do so.



- 3. If you saw a galaxy that did not have any blue stars, what would you conclude about its rate of star formation?
- 4. The Sun makes one revolution around the center of the galaxy approximately every 250,000,000 years. How many laps has the sun done since it formed about 5 billion years ago? How many more will it complete before becoming a white dwarf?

5. Look at the Hubble tuning fork. How would you classify the spiral galaxy you made?

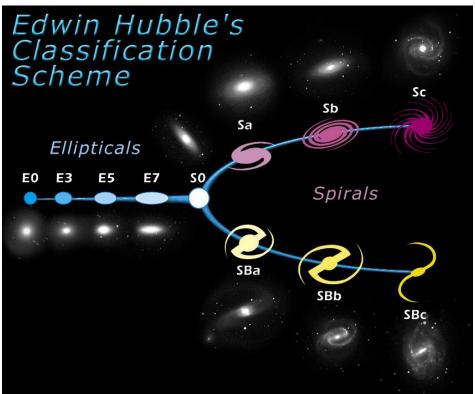


Figure 1 NASA/ESA

Extend:

- Look at the Milky Way Project by Zooniverse. How can you take part in real astronomy by spotting bubbles and clouds in the galaxy?
- Search *Photopic sky survey* to get an amazing view of our galactic home.