

Chp 14-Review Questions. Investigating Other Galaxies

1. Why did many nineteenth-century astronomers think that the “spiral nebulae” are part of the Milky Way?
2. What was the Shapley-Curtis “debate” all about? Was a winner declared at the end of the “debate”? Whose ideas turned out to be correct?
3. How did Edwin Hubble prove that the Andromeda “Nebula” is not a nebula within our Milky Way Galaxy?
4. What is the Hubble classification scheme? Which category includes the largest galaxies? Which includes the smallest? Which category of galaxy is the most common?
5. Which is more likely to have a blue color, a spiral galaxy or an elliptical galaxy? Explain why.
6. Why are Type Ia supernovae useful for finding the distances to very remote galaxies? Can they be used to find the distance to any galaxy you might choose? Explain your answers.
7. What is the Tully-Fisher relation? How is it used for measuring distances? Can it be used for galaxies of all kinds? Why or why not?
8. Some galaxies in the Local Group exhibit blueshifted spectral lines. Why aren’t these blueshifts violations of the Hubble law?
9. What is the difference between a cluster and a supercluster? Are both clusters and superclusters held together by their gravity?
10. What are starburst galaxies? How can they be produced by collisions between galaxies?
11. What evidence is there for the existence of dark matter in clusters of galaxies?
12. What is gravitational lensing? Why don’t we notice the gravitational lensing of light by ordinary objects on Earth?
13. When quasi-stellar radio sources were first discovered and named, why were they called “quasi-stellar”?

Chp 14-Discussion Questions. Investigating Other Galaxies

1. Earth is composed principally of heavy elements, such as silicon, nickel, and iron. Would you be likely to find such planets orbiting stars in the disk of a spiral galaxy? In the nucleus of a spiral galaxy? In an elliptical galaxy? In an irregular galaxy? Explain your answers.
2. Discuss the advantages and disadvantages of using the various standard candle distance indicators to obtain extragalactic distances.
3. Describe what sorts of observations you might make to search for as-yet-undiscovered galaxies in our Local Group. How is it possible that such galaxies might still remain to be discovered? In what part of the sky would these galaxies be located? What sorts of observations might reveal these galaxies?

Chp 14-Collaborative Group Exercises. Investigating Other Galaxies

1. In the early twentieth century, there was considerable debate about the nature of spiral nebulae and their distance from us, but the debate was resolved by improvements in technology. As a group, list three issues that we, as a culture, did not understand in the past but understand today, and explain why we now have that understanding.
2. Even though there are billions of galaxies, there are not billions of different kinds. In fact, galaxies are classified according to their appearance. As a group, dig into your book bags and put all of the writing implements you have (pens, pencils, highlighters, and so on) in a central pile. Remember which ones are yours! Determine a classification scheme that sorts the writing implements into at least three to six piles.

INVESTIGATING ASTRONOMY END-OF-CHAPTER QUESTIONS & EXERCISES

3. Write down the scheme from Exercise 2 and the number of items in each pile. Ask the group next to you to use your scheme and sort your materials. Correct any ambiguities before submitting your classification scheme.
4. Imagine your company, Astronomical Artistry, has been contracted by the local marching band to create a football halftime show about spiral galaxies. How exactly would you design the positions of the band members on the field to represent the different spiral galaxies of classes Sa, Sb, and Sc? Create two columns on your paper by drawing a line from top to bottom, drawing sketches in the left-hand column, and writing a description of each sketch in the right-hand column. Also include what the band's opening formation and final formation should be.