① Read the pages outlined and/or follow the instructions given.
② Unless space has been given, answer the questions on a separate sheet and then staple it to this sheet.
③ Use complete sentences when necessary (i.e. explain, describe, why, ...). Also, watch your spelling and grammar and be sure to write neatly!

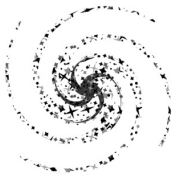
A. Definitions/Check & Reflect on Your Reading (P.268-277)

{3} 1. Define the following terms:
(a) black hole (b) dark matter (c) galaxy
{2} 2. What is the diameter and thickness of the Milky Way in light-years?
{3} 3. Why do galaxies with more dust than other galaxies generally produce more new stars?
{3} 4. What evidence leads astronomers to believe that every galaxy contains at least one massive black hole at its centre?
{2} 5. What do astronomers speculate makes up at least 90% of the matter in the universe?
{3} 6. Even when two galaxies collide, why do very few of their stars collide with each other as well?

B. Activity #1 (Hunting for Galaxies P.269)

1. Use a pair of scissors to carefully cut out the square below. This paper with the rectangle cut out will become your "viewing area" for step 2. (This is to help cut down on the amount of "viewing" you have to do!)
2. Place your "viewing area" from step 1 anywhere on the Hubble Ultra Deep Field image shown at the start of this unit (P.254). Use the chart below to identify as many different kinds of galaxies as you can see in this "viewing area".
3. Record your results in the chart below. Some galaxies will appear as a tiny dot, too difficult to classify. Count as many of these as you can and record them as "unclassified".

{2} 4. Add up the total number of galaxies that you looked at, including "unclassified." Record this total.
{2} 5. Calculate the percentage of each type of galaxy (see note). Record these percentages to the nearest whole number.
{1} 6. Rank the galaxies according to your % values, with 1 being the largest %.

Spiral	Barred-Spiral	Elliptical	Irregular
			

CUT ME OUT
(DON'T CUT YOURSELF)

THIS IS YOUR VIEWING AREA FOR STEP 2

(DON'T CUT YOURSELF)
CUT ME OUT

	Spiral	Barred-Spiral	Elliptical	Irregular	Unclassified	TOTAL
#						
%						100%
rank?						

NOTE: % = # ÷ Total × 100

C. Activity #2 (Math Scaling P.275)

{9} 1. Because distances in space are so vast, they can only be represented by scaling (scales are used to show an object in larger or smaller form, but in the same proportions as the original object). Use the example given on P.275 to help solve the following scale distance problems:
(a) The distance from your home to the corner store is 2.0 km. The scale distance is 10 cm. If the distance from your home to the library is 3.0 km, what is the scale distance to the library?
(b) The distance from the Sun to Earth is 1 AU. The distance from the Sun to Jupiter is 5.2 AU. If the scale distance from the Sun to Earth is 8.0 cm, what is the scale distance to Jupiter from the Sun?
(c) The scale distance between the Milky Way galaxy and the Andromeda galaxy is 20 cm = 12.5 million ly. What is the scale distance to the Sombrero galaxy, 29 million ly away?