Critical Thinking Skills

Galaxies & the Universe

Skills For Critical Thinking		Reading Comprehension							
		Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Hands-on Activities
LEVEL 1 Knowledge	• List Details/Facts	✓	✓	✓	✓	✓	✓	✓	✓
	• Recall Information	✓	✓	✓	✓	✓	✓	✓	
	• Match Vocab. to Definitions	✓	✓		✓	✓	✓	✓	
	• Define Vocabulary	✓		✓	✓			✓	
	• Label Diagrams				✓			✓	
	• Recognize Validity (T/F)	✓	✓	✓		✓	✓		
LEVEL 2 Comprehension	• Demonstrate Understanding	✓		✓	✓		✓	✓	✓
	• Explain Scientific Causation		✓	✓			✓		
	• Rephrasing Vocab. Meaning		✓	✓	✓				
	• Describe	✓				✓		✓	✓
	• Classify into Scientific Groups					✓	✓		
LEVEL 3 Application	• Application to Own Life	✓		✓			✓	✓	✓
	• Model Scientific Process					✓			
	• Organize and Classify Facts	✓			✓				
	• Utilize Alternative Research Tools	✓	✓			✓		✓	
LEVEL 4 Analysis	• Distinguish Roles/Meanings		✓			✓			
	• Make Inferences	✓		✓		✓	✓		✓
	• Draw Conclusions Based on Facts Provided	✓		✓		✓		✓	✓
	• Classify Based on Facts Researched		✓	✓			✓		
LEVEL 5 Synthesis	• Compile Research Information	✓	✓		✓	✓			
	• Design and Application	✓		✓	✓			✓	
	• Create and Construct	✓		✓			✓	✓	✓
	• Imagine Self in Scientific Role		✓		✓		✓	✓	
LEVEL 6 Evaluation	• State and Defend an Opinion		✓		✓		✓		
	• Justify Choices for Research & Topics	✓	✓	✓	✓	✓		✓	
	• Defend Selections and Reasoning			✓					✓

Based on Bloom's Taxonomy

NAME: _____

Galaxies

1. Activate your prior knowledge: You might already know that the solar system is part of the Milky Way galaxy. What else do you know about the Milky Way? Give as much detail as you can.

2. Complete each sentence with a word from the list. Use a dictionary to help you.

star	galaxy	gravity	Sun	Milky Way	solar system

a) The stars in a galaxy are held together by a strong pull called _____. This is the same force that holds things onto the Earth.

b) A _____ is a ball of hot gas that is burning in the Universe. Eventually, they all burn out, explode or cool off.

c) Stars are gathered into large groups. Each large group of stars is called a _____.

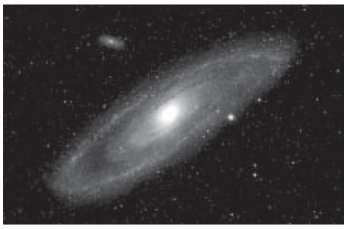
d) The Sun is the center of our _____. All of the planets orbit around the Sun.

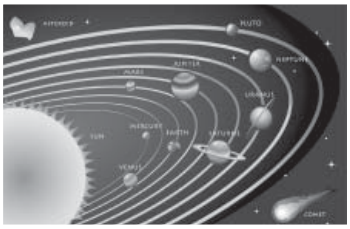
e) The _____ is just one of the stars that are part of our galaxy. It rotates around the center of the galaxy like all of the other stars in it.

f) Our galaxy is called the _____ because of how it looks when you see it spread out across the sky.

3. a) Label the diagrams using the following words: star, solar system, galaxy.

A: _____ B: _____ C: _____





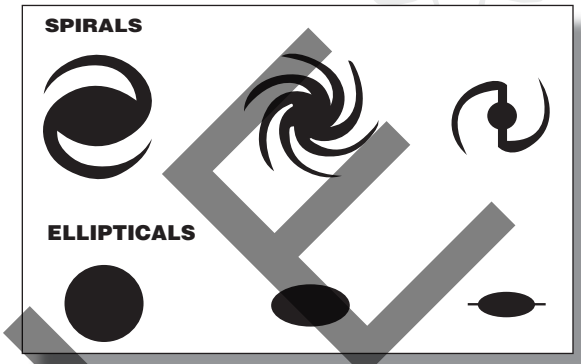
b) List the above objects in order from smallest to largest.

_____, _____, _____

NAME: _____

Galaxies

At the beginning of time, the Big Bang sent all of the things in the Universe flying out in all directions. This included the **stars**. A star is a ball of hot gas. The hottest stars are blue or white and the coolest ones are red. Stars are much larger than planets. There are as many as 100 billion stars in the Universe. These stars are grouped into enormous clusters called **galaxies**.



Each galaxy contains millions and millions of stars. The stars in each galaxy stay clumped together by **gravity**. Think of a galaxy like a big ship of stars floating around in the empty ocean of space. There isn't just one ship in this ocean though. There are millions and millions of galaxies. You might think this would make the ocean crowded with ships. It's not. In fact, the space between the ships, or galaxies, is even bigger than the ships themselves. This space is called **interstellar space**.

<u>Visualize:</u> You just read an analogy, or comparison, to help you understand the size of galaxies. Draw a picture of what was described above to show what you learned about them.

_____

_____

Galaxies can form in different shapes. You may have seen pictures of how the Milky Way galaxy looks like a big swirl. (Picture a cup of black coffee. Pour in some cream and stir with a spoon. The swirl you see is like the shape of the Milky Way galaxy.) This is called a **spiral** galaxy. Galaxies also come in **barred spiral, elliptical** and **irregular** shapes.

Most galaxies are far away from the Earth and can only be seen through powerful telescopes. Scientists continue to discover new galaxies. When a new galaxy is discovered, it is given a number. For example, M105 and M51. The galaxies may also have nicknames, based on what they look like. M105 is called the Sombrero (a big, Mexican hat), and M51 is called the Whirlpool. As the Universe grows, galaxies are still forming on its far edges.

NAME: _____

Galaxies

1. Use the words in the box to answer each question.

elliptical	**Milky Way**	**interstellar**	**spiral**	**Ice Age**
red	**Big Bang**	**Andromeda**	**blue**	**Local**

_____ **a)** What is the shape of the Milky Way galaxy called?

_____ **b)** What is the space between the stars called?

_____ **c)** Which group of galaxies does the Milky Way belong to?

_____ **d)** Which event marked the beginning of time in our Universe?

_____ **e)** Which galaxy is the farthest object in the Universe that can be seen with the naked eye?

_____ **f)** Which stars are hotter: red or blue stars?

2. Circle the word True if the statement is true. Circle the word False if it is false.

a) Galaxies are groups of stars, held together by gravity that rotate around their own center.

True **False**

b) Galaxies come in different shapes, like the spiral, whirlpool, starburst and carousel galaxies.

True **False**

c) The Earth and its solar system are just a tiny part of the Milky Way galaxy.

True **False**

d) The Milky Way galaxy is the only galaxy that can be seen from Earth with the naked eye. The others are too far away to be seen.

True **False**

e) The Milky Way galaxy is only slightly larger than the solar system.

True **False**

f) The Andromeda galaxy is larger than the Milky Way galaxy, and is the same shape as well.

True **False**