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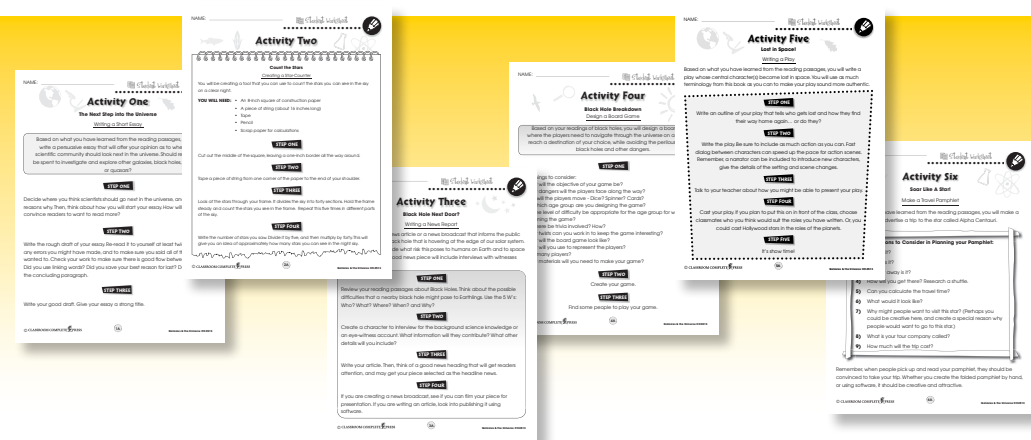
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- Click on item CC4513 – Galaxies & the Universe
- Enter pass code CC4513D





# Galaxies

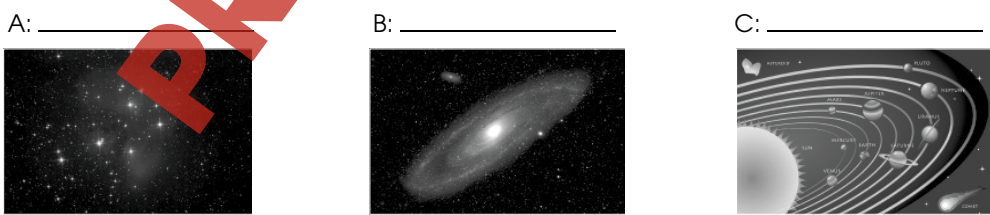
1. **Activate your prior knowledge:** You might already know that the solar system is part of the Milky Way galaxy. What else do you know about the Milky Way? Give as much detail as you can.

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.

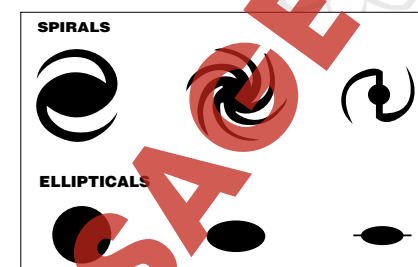


b) List the above objects in order from smallest to largest.



# Galaxies

**A**t 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**.

**Visualize:** 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.

**STOP**

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.



# Galaxies

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

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

# Galaxies

3. Answer each question with a complete sentence.

- a) Why do you think new galaxies are being discovered all of the time?  
\_\_\_\_\_
- b) Where are new galaxies forming?  
\_\_\_\_\_
- c) Which is larger, the size of the galaxies or the space in between them?  
\_\_\_\_\_

## Research & Extension

**Light pollution** is an environmental problem that threatens to erase our night sky. You will research this problem and write a report to help inform others about it. Follow the steps below:

- Conduct research on the growing problem of light pollution.
- Organize your findings on the graphic organizer provided.
- Once you have filled each box to your satisfaction, write a report about the problem of light pollution. Organize your report into three paragraphs, based on the boxes from the organizer.
- Re-read your report at least three times. Edit any mistakes that you find. Don't be afraid to change the order of things you wrote, and add in more information.
- Write, or type, a good draft of your report. Don't forget to include a title.



# Build It!

## MAKE A NEBULA

### You need:

- 1 casserole dish (or other clear dish of a similar size)
- 1 pipette
- 1 sheet black construction paper
- 1 bottle clear nail polish
- newspaper
- water

### Steps

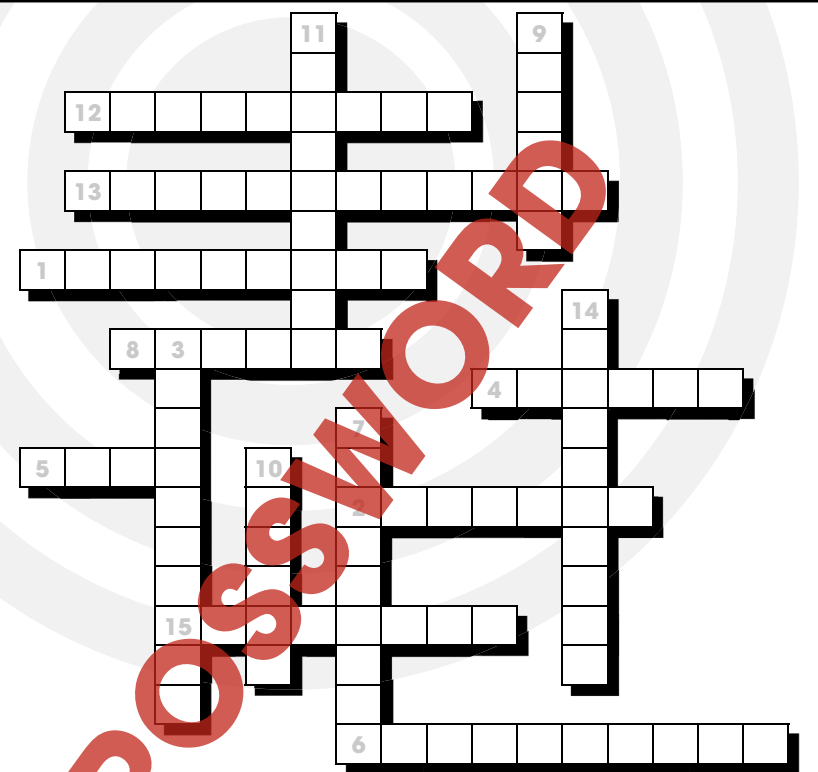
- STEP ONE:** Fill the dish halfway with water and soak the paper in it. Make sure the paper is at the bottom of the dish.
- STEP TWO:** Fill the pipette with polish and place one drop in the center of the dish. Wait for the nebula to form.
- STEP THREE:** When it forms, wait about 5 seconds for it to harden on the surface of the water.
- STEP FOUR:** Lift the paper to catch the nebula and wait for it to dry on the paper.
- STEP FIVE:** Examine the nebula that formed.



# Crossword Puzzle!

### Word List

- Astronomer
- Black Hole
- Elliptical
- Galaxy
- Gravity
- Interstellar
- Light Year
- Matter
- Milky Way
- Nebula
- Quasar
- Reflection
- Satellite
- Star
- Telescope



### Across

1. An object that you cannot really see in space (2 words)
2. A force that tries to pull two objects together
4. An enormous group of star clusters
5. A ball of hot gas
6. One of the types of nebulae
8. The whole universe is made up of these tiny particles
12. The moon is a \_\_\_\_\_ of the Earth because it orbits around it
13. The space between stars is called this
15. The name of the galaxy that our solar system rotates across (2 words)

### Down

3. A scientist who studies the universe
7. A unit used to measure distance in space (2 words)
9. The most distant objects in the universe that we can see
10. A cloud of dust and gas
11. A tool used to see objects in space
14. One of the shapes that a galaxy may take



### Part A

## Comprehension Quiz

30

Circle the word **TRUE** if the statement is TRUE or Circle the word **FALSE** if it is FALSE.

1. The solar system consists of the Sun and everything that orbits it.  
**TRUE**      **FALSE**
2. Looking out into the universe is like looking back in time.  
**TRUE**      **FALSE**
3. A *light year* is not quite as long as a year. It is only 300 days.  
**TRUE**      **FALSE**
4. A *nebula* is a cloud of dust and gas in space.  
**TRUE**      **FALSE**
5. Gravity is a force that pushes two objects away from each other.  
**TRUE**      **FALSE**
6. The Sun is a star in the Milky Way galaxy.  
**TRUE**      **FALSE**
7. The force of gravity is so weak near black holes that they are invisible.  
**TRUE**      **FALSE**
8. Scientists continue to discover new things about the universe.  
**TRUE**      **FALSE**

### Part B

Sort the words in the Word Bank into logical groups by writing each word into a space that makes the best fit. (e.g. **PETS:** cat, dog, rabbit)

1. Quasar:      old      far      a) \_\_\_\_\_
2. Galaxies:      elliptical      barred      b) \_\_\_\_\_
3. Big Bang:      explosion      fireball      c) \_\_\_\_\_
4. Light year:      measure      travel      d) \_\_\_\_\_
5. Nebula:      gas      dust      e) \_\_\_\_\_
6. Milky Way:      Local Group      stars      f) \_\_\_\_\_

### WORD BANK

- distance
- spiral
- cloud
- galaxy
- bright
- theory

## The Rosette Nebula

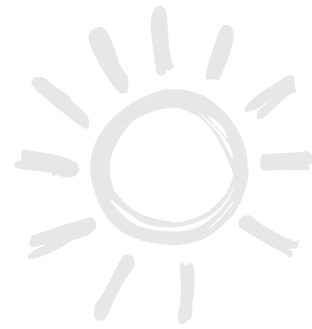




After You Read

NAME: \_\_\_\_\_

# Nebulae



## 4. Answer each question with a complete sentence.

a) Describe the size of most nebulae.

\_\_\_\_\_

b) How are stars formed inside nebula clouds?

\_\_\_\_\_

c) Why can't you see what is behind an Absorption nebula?

\_\_\_\_\_

## Research & Extension

There are many famous nebulae that scientists have closely observed and photographed. Some of the most famous ones are called: *Crab Nebula, Pleiades Cluster, Horsehead Nebula, Eagle Nebula, Cygnus Loop, Orion Nebula*

Research three of them. For each nebula, include a sketch, the type that it is and a description of it in your notes. Think about how you will format your notes. A table could work with headings in the columns and rows. Are there other ways you could creatively present this information?

Ideas:

- a chart
- a team of four superheroes
- a model of four different nebulae
- a computer slideshow
- other:

Prepare to orally present your three nebula to the class.

4.

a) They can be quite large, spreading across numerous light years.

b) Dust and gas get compressed in the cloud and as they are compressed they get very hot. When they are packed and hot enough they can explode creating a new star.

c) They have a lot of stuff packed into them. There is so much gas and dust in them they block out all light from behind.

1.

Answers will vary

2.

a) gravity

b) star

c) galaxy

d) solar system

e) Sun

f) Milky Way

3.

- a) A) star B) galaxy C) solar system

b) star, solar system, galaxy

21

Drawings will vary

22

1.

- a) spiral
- b) interstellar
- c) Local
- d) Big Bang
- e) Andromeda

f) blue

2.

- a) True
- b) False

c) True

d) True

e) False

f) True

24

3.

a) more powerful telescopes being invented or universe continues to expand

b) at the 'edge' of the universe

c) space between them

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EASY MARKING ANSWER KEY