Contents

Before You Read

NAME: _____

Quasars

1. Explain what you know about how the universe began. How do we know how old things are in the universe? Write a journal entry on this topic.

2. A synonym is a word that has the same meaning as another word. For example, *kind* and *nice* are synonyms. Match up pairs of synonyms from the list below. A thesaurus is a synonym dictionary. It might help you with this activity.

a) devour _____
b) enormous _____
c) form _____
d) old _____
e) distant _____
f) energy _____
g) edge _____
h) capture _____
i) powerful _____
j) collide _____

1. strong
2. border
3. create
4. power
5. gigantic
6. eat
7. catch
8. far
9. ancient
10. crash

3. Circle the following items that you would use a telescope to see?

a) Pluto
b) China
c) Asteroids
d) Underwater volcanoes
e) Galaxies
f) Gravity

NAME: _____

Reading Passage

Quasars

The farther things are away in the universe, the older they are. **Quasars** may be the most distant objects in the universe. They look like stars, but they are about the size of our whole solar system. Quasars give off great amounts of energy and are super bright. In fact, they can be a trillion times brighter than the Sun!

Quasars are ten to fifteen billion **light years** away, right at the edge of the universe. When we look at quasars, we are looking ten to fifteen billion years into the past. They are very old. There is nothing in our part of the universe that is so bright. That is because any quasars that are near our solar system are so old that they died down long ago. Our **Milky Way** galaxy may have been a quasar a long time ago.

STOP

Make a Prediction: What do you think that Quasars might be?

_____

_____

Astronomers think that the energy from quasars might be from the black holes in galaxies that are far, far away. It could be that quasars are **super giant black holes** that are devouring entire stars. Some scientists think that they are formed when two **galaxies** collide. One galaxy forms inside the black hole of another. Then, it captures all of the stars and dust to make a super giant black hole.

It is important to study quasars because they can tell us about the beginning of our universe. Right now, quasars look like a pinprick of light in even the most powerful telescopes. As technology develops perhaps we will be able to learn more about quasars. Perhaps quasars will teach us more about how the universe began.

After You Read

NAME: _____

Quasars

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

a) One quasar can be the size of our solar system.
TRUE **FALSE**

b) Quasars are the oldest things we can see in the universe because they are also the farthest things that we can see.
TRUE **FALSE**

c) Quasars are not as bright as our galaxy.
TRUE **FALSE**

d) Scientists can get a good look at quasars using powerful telescopes.
TRUE **FALSE**

e) Quasars might have been made by planets crashing into each other.
TRUE **FALSE**

f) Quasars are ten to fifteen billion light years away.
TRUE **FALSE**

g) Quasars might be big black holes from long ago.
TRUE **FALSE**

2. Write each word beside its meaning.

quasars **light year** **black hole** **galaxy** **Milky Way** **gravity** **telescope**

_____ **a)** A broad band of light that looks like a trail of spilled milk in the night sky. It is created by the millions of faint stars that form part of our galaxy.

_____ **b)** A group of stars, star clusters and other matter.

_____ **c)** The distance that a ray of light travels in one year.

_____ **d)** The force of attraction that pulls a smaller object toward a more massive object.

_____ **e)** An invisible area of space that has an enormous pull of gravity.

_____ **f)** Distant and star-like in appearance, these are thought to be the center of ancient galaxies.

_____ **g)** A tool used for seeing objects in space that are far away.

NAME: _____

After You Read

Quasars

3. Answer each question with a complete sentence.

a) Why do scientists think that the Milky Way may have once been a quasar?

_____

_____

b) Why is it important to study quasars?

_____

_____

c) Where do quasars get their energy?

_____

_____

Research & Extension

Make a list of as many "I wonder…" statements as you can about things you still want to know about black holes and quasars. These statements may also be relating to things you still find confusing or don't understand. In this activity, you will be trying to find answers to these questions by visiting a website. Create a table with your question statements on one side and blank boxes for new information you find on the other.

You will need access to the internet for this activity. Visit the Hubble site at

http://hubblesite.org/explore_astronomy/black_holes/index.html

and participate in the program called **Black Holes: Gravity's Relentless Pull.** This program will give you the opportunity to drive a spacecraft to the outer edges of the universe in order to explore black holes and quasars up close.

As you participate in the program and find answers to your questions, write down the information in the blank boxes. When you are finished, examine how many blank boxes you still have. Are you satisfied with them, or do you want to do more research on this topic?

Wonder…	New Information

Hands-On Activity #3

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.

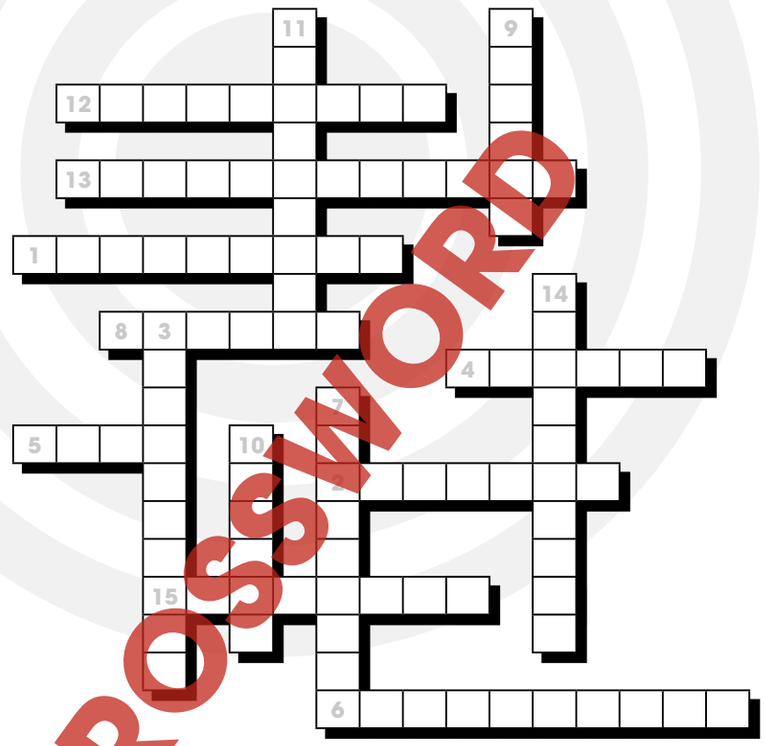
STEP FIVE: Examine the nebula that formed.

After You Read

NAME: _____

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

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After You Read

Comprehension Quiz

Part C

Answer the questions in complete sentences.

1. Outline the most commonly-accepted theory of how the universe began. /4

2. Give two roles that gravity plays in the universe. /2

3. What is the difference between *rotate* and *orbit*? Give an example of an object that does each to show your understanding. /4

4. Why can't we see black holes? /3

5. Why is it important to study *quasars*? /3

SUBTOTAL: /16

The Milky Way Galaxy

NAME: _____

After You Read

Quasars

3. Answer each question with a complete sentence.

a) Why do scientists think that the Milky Way may have once been a quasar?

_____

_____

b) Why is it important to study quasars?

_____

_____

c) Where do quasars get their energy?

_____

_____

Research & Extension

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Wonder...	New Information

3.

a) Galaxies seem like burned out quasars

b) they could teach us about the beginning of time (Big Bang)

c) from black holes in far away galaxies

EZ

Crossword Puzzle!