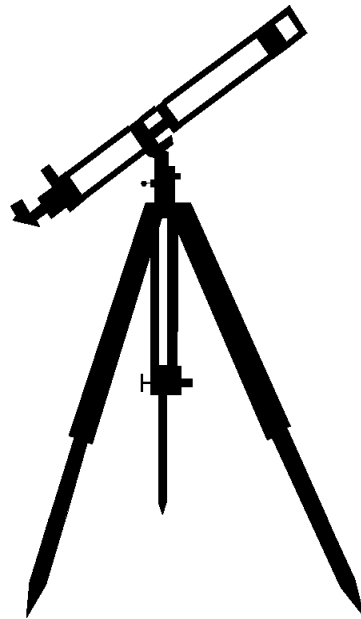




**Universe Cycle**  
The Search for Our Beginnings



# FIRST GRADE UNIVERSE



1 WEEK  
LESSON PLANS AND  
ACTIVITIES

**UNIVERSE CYCLE**  
**OVERVIEW OF FIRST GRADE**

**UNIVERSE**

**WEEK 1.**

PRE: *Describing the Universe.*

LAB: *Comparing and contrasting bodies that reflect light.*

POST: *Exploring the meaning of stars.*

**SOLAR SYSTEM**

**WEEK 2.**

PRE: *Differentiating between a star and a planet.*

LAB: *Discovering the surface of some planets.*

POST: *Comparing and contrasting the planets of our Solar System.*

**EARTH**

**WEEK 3.**

PRE: *Comparing night and day.*

LAB: *Exploring rotation on the Earth's axis.*

POST: *Analyzing evidence that the Earth rotates.*

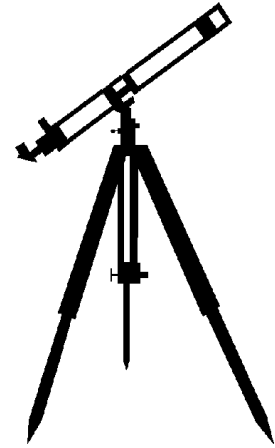
**GEOGRAPHY**

**WEEK 4.**

PRE: *Discovering a relief map.*

LAB: *Exploring with a compass.*

POST: *Comparing geographic locations.*



## UNIVERSE CYCLE - UNIVERSE (1)

### PRE LAB

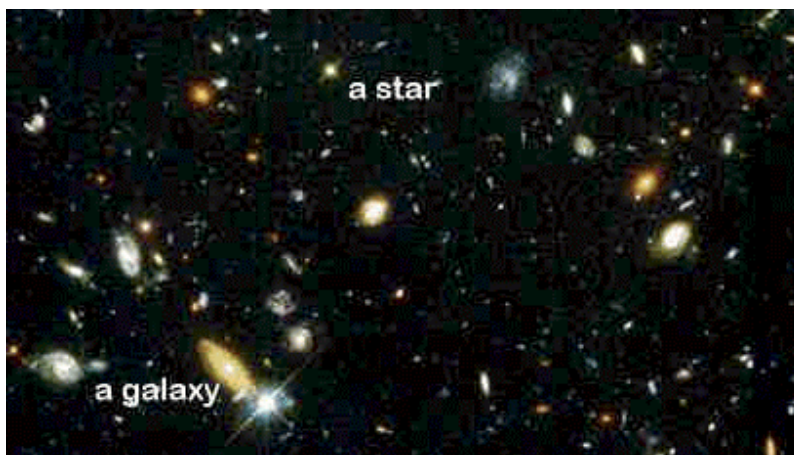
Students are use a worksheet to compare the components of the Universe.

### OBJECTIVES:

1. Comparing the Universe with the Solar System.
2. Describing the Universe.

### VOCABULARY:

galaxy  
nebula  
planet  
plasma  
Solar System  
star  
Universe



### MATERIALS:

crayons  
*The Sky is Full of Stars* by F. Branley  
worksheet

### BACKGROUND:

The Universe is everything students see in the night sky, and more that they don't see! Remember students do not have to understand objects such as planets, stars, and galaxies. It is enough that they can begin recognizing the components of the Universe. Current evidence suggests that there is only one Universe that has evolved over the last 15 billion years. There are many doubts about specific "facts" on the Universe because it is "untouchable" by humans.

The Universe is the big picture; every component within the Universe (like the stars) is a subset. The Universe is not empty, but is full of dynamically evolving objects. Stars can be considered "burning" gases of helium and hydrogen that give off heat, light, and plasma. Plasma is the most abundant form of matter in the Universe; it can be explained as free electrons in an excited energy state. The "glow" in a fluorescent light bulb is an example of plasma. Stars have a life cycle; they are born, burn for millions to billions of years, and eventually die out.

Other objects in the Universe include galaxies, nebulae, dark matter, other solar systems, asteroids, and comets. Stars that are close together and rotate as a unit are called a galaxy. Our Sun is part of the Milky Way Galaxy. A nebula is a cloud of gas and

dust. Nebulas may form when stars explode as supernovas. Stars may also be “born” in nebulas. Asteroids are chunks of rock left over from the formation of the Solar System. Similarly, comets are balls of ice and minerals left over from the creation of the Sun and planets. We see them glowing in the night sky when they orbit close to the Sun and heat up, throwing off glowing tails. A solar system is an arrangement of planets around a central star or stars. Our Solar System includes the Sun, the nine planets, their associated moons, and countless asteroids and comets. There have been mathematical observations of other planetary systems in the late 1990's. Dark matter is just what it sounds like: material that is not visible by ordinary means. Astronomers hypothesize that dark matter exists because their work suggests that too little visible matter exists to account for the gravity and mass of the Universe.

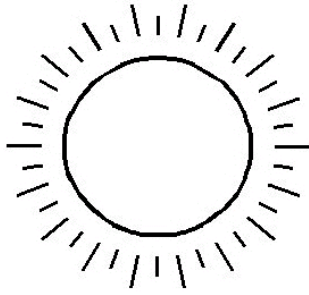
## **PROCEDURE:**

1. This lesson starts your students on a voyage to understanding the Universe. They have seen the night sky and they probably have always asked questions about the sky. You may want to start this lesson with some oral communication skills. Ask the students to tell the class what they think is in the night sky. You may want to list some of their key observations which should include stars, moons, twinkles, and sometime even UFO's!

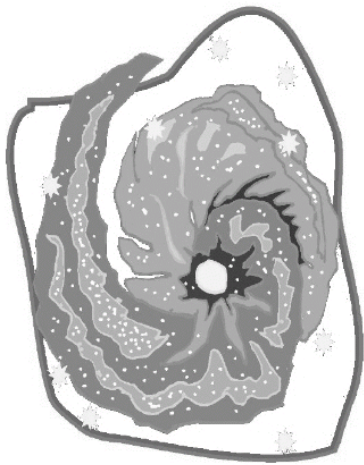
2. After the discussion on what the children have observed, describe the Universe for students. Emphasize that we are still learning about what makes up the Universe. We are far from knowing everything about it. You may wish to explain that facts and figures about the Universe are subject to change with new information from astronomers.

3. Read the students a book on stars. We recommend *The Sky is Full of Stars*. It reinforces the discussion on the night time sky and puts the facts into an understandable story. Note to students that stars are not “star shaped.” A star appears to twinkle, and hence star-like, because of atmospheric disturbance of light that we see (and some other factors.)

4. Use the worksheet to reinforce the different larger components of the Universe. Students can color and use their imagination.



STAR



GALAXY



NEBULA

## UNIVERSE CYCLE - UNIVERSE (1)

### LAB

Students learn that stars generate their own light.

### OBJECTIVES:

1. Discovering that the Sun is a star.
2. Comparing and contrasting bodies that reflect light.

### VOCABULARY:

comet  
light  
reflect  
star

### MATERIALS:

comet ball  
energy ball  
flashlight

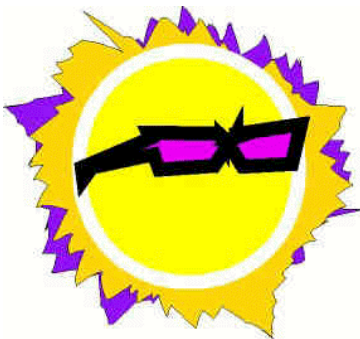


This is a spiral galaxy with many stars generating their own energy.

### BACKGROUND:

A star is a ball of burning gases, mostly hydrogen and helium. A star shines or glows because its gravity causes its gases to fuse together. This process releases energy, hence the “shine”. Our Sun is only a medium-sized star. There are stars that are bigger, smaller, hotter, and cooler. However, the Earth is very small compared to the Sun. More than a million Earths could fit into the Sun. All life on Earth depends on the Sun for light and heat.

Until the seventeenth century, most scientists thought that the Earth was the center of the Universe, mainly because it appears that way to casual observation. It is quite obvious that the Sun and Moon travel across the sky from east to west. Ancient people often thought that the Sun and Moon were gods with chariots such as Apollo and Athena, and gave them personalities.



Part of this confusion was because while all sky objects appear bright, some stars and galaxies (collections of stars) radiate light, while the others only reflect it. This is sometimes difficult for children to understand as well. When they look up at the night sky, they see the brightly shining moon. How can it be that it does not produce its own light, but yet it shines?

The stars make their own light. The Moon, planets, asteroids, natural satellites, and comets shine by light reflected

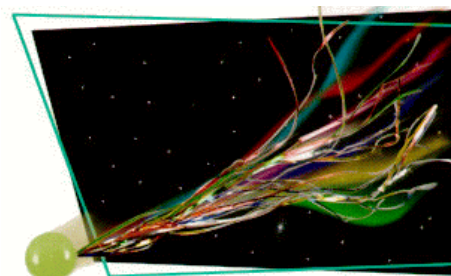
from the Sun. The Moon has no light of its own, so it appears to have phases, cycling from new Moon to full Moon and back every 29 ½ days. The phases happen because of the angle at which the Sun's rays strike the Moon relative to the Earth, but the exact mechanism will be explained in the later grades.

## PROCEDURE:

1. In this lab activity, students will learn that bodies in space can be classified in two many ways: (1) those bodies that produce light (stars) and (2) those bodies that do not (planets, comets, meteorites, and most everything else in space).

2. A flashlight or an energy ball can be an example of an object that produces its own light. Show students these items and discuss whether the light is produced inside or not. A flashlight is like a star. If you put an object, like a basketball in a dark room, you will not see the basketball. However, if you shine the flashlight on the ball, you can see the basketball in the dark. The basketball is the Moon or Earth and the flashlight is the Sun. You may want to demonstrate this in class.

3. Comets also reflect light from the Sun. A comet is an object that is made up of gases and "rocks." Comets do not pass Earth very often and ancient peoples were frightened of them. Give each pair of students one "comet ball." (A ball with reflective streamers.) Give several students the energy balls to act as shining stars in the room. Two or three students should have control of the flashlight to shine it as students are tossing the comets.



Comet ball

4. Students will have to throw the comets to their partner. Make them practice several times because when you turn the lights out you want them to be able to catch the comets. Then turn the lights off and ask students if they can see any comets when they throw them to their partner. They should answer no. Next, put several flashlights around the room, and shine them on the energy balls. Have the students throw the comets again. Ask them when can they see the comets. They should realize that the comets are only visible when they come into contact with the light. The comet is reflecting light, not producing light. The students using the energy balls are representing stars.



## UNIVERSE CYCLE - UNIVERSE (1)

### POST LAB

Students explore the patterns of stars.

### OBJECTIVES:

1. Exploring the meaning of stars.
2. Discovering constellations in the night sky.

### VOCABULARY:

constellation  
galaxy  
star

### MATERIALS:

*Glow in Dark Night Sky Book* by  
Clint Hatchett (Random House)  
Internet

### BACKGROUND:

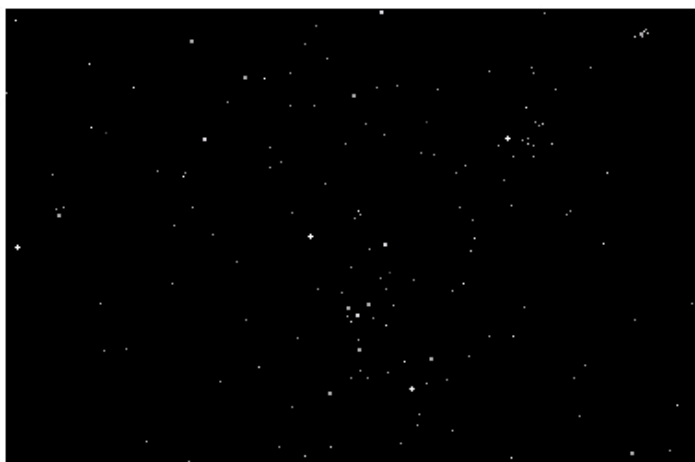
Students have learned that stars make their own energy, which is how they produce light. Although the stars are still in the sky during the day, the light of the Sun prevents us from seeing them. Only on a clear night can we see the stars. Cloud cover can also prevent the light from the stars from reaching our eyes.

The stars are long distances from us on Earth. Large, far away stars seem smaller than they really are.

Our Solar System is in a grouping of stars called the Milky Way Galaxy. Most of the stars we see at night are from the Milky Way.

However, it is often difficult to tell a star from the Milky Way from another galaxy in the sky. Far away galaxies may also appear as single points of light.

Early people grouped many of the bright objects in the sky as constellations. A constellation is a group of stars that, viewed from Earth, appear to form a regular pattern. There are 88 recognized constellations. Many are associated with myths. Constellations are fun, and help us locate stars and galaxies in the sky. However, they are not a scientific grouping, because they are mixtures of stars and galaxies, that may be near or far objects.





## PROCEDURE:

1. Use the suggested or other appropriate books to show different constellations to the students. You may want to show them pictures of how the ancients grouped the stars. The ancients saw bulls, twins, people, and many other images. Use the constellation books to increase the imagery of your students. You may want them to open a page and have them describe the grouping of light, or make them make their own constellations.

2. There are several websites that you can use to simulate the night time sky. The following are sites that we recommend.

<http://opposite.stsci.edu/pubinfo/Anim.html>

Animations of planets and galaxies. The home site also contains many, many Hubble Space Telescope pictures.

<http://www.nationalgeographic.com/features/97/stars/>

“Star Journey” - a National Geographic site which includes star charts of the night time sky.

<http://www.astro.wisc.edu/~dolan/constellations/>

The constellations and their stars. Includes interactive sky charts and pictures of stars and galaxies.