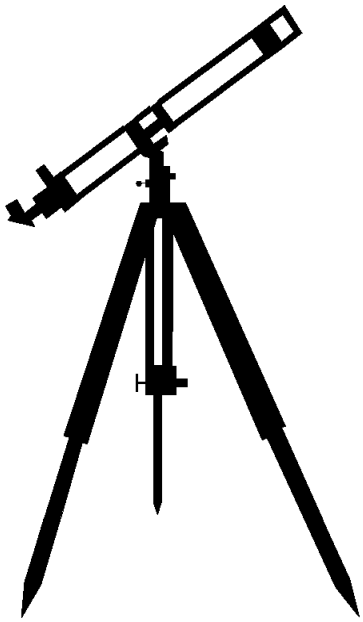
Universe Cycle

The Search for Our Beginnings

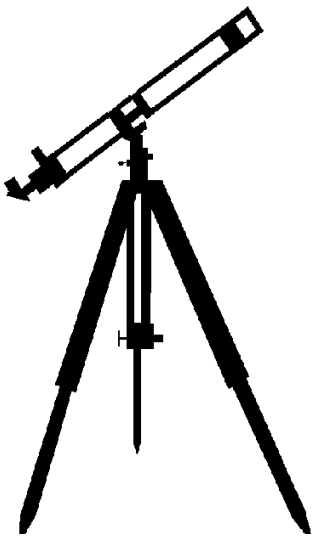
SECOND GRADE

EARTH



1 WEEK
LESSON PLANS AND
ACTIVITIES

UNIVERSE CYCLE
OVERVIEW OF SECOND GRADE



UNIVERSE

WEEK 1.
PRE: *Discovering stars.*
LAB: *Analyzing the geometric pattern of constellations.*
POST: *Exploring myths about the constellations.*

SOLAR SYSTEM

WEEK 2.
PRE: *Comparing the 9 planets of our Solar System.*
LAB: *Comparing the distance between planets.*
POST: *Exploring terrestrial and gas planets.*

EARTH

WEEK 3.
PRE: *Comparing the Earth and the Moon.*
LAB: *Exploring the characteristics of the Earth's surface.*
POST: *Exploring the features of the Moon.*

GEOGRAPHY

WEEK 4.
PRE: *Contrasting different types of maps.*
LAB: *Exploring longitude and latitude.*
POST: *Comparing maps and globes.*

UNIVERSE CYCLE - EARTH (2)

PRE LAB

Students trace the phases of the Moon.

OBJECTIVE:

1. Comparing the Earth and the Moon.
2. Discovering why the Moon changes at night.

VOCABULARY:

atmosphere
hydrosphere
planet

MATERIALS:

The Moon Seems to Change by F. Branley
worksheet

BACKGROUND:

The Moon is the Earth's satellite. Students are familiar with the Moon because they see it at night. However the Moon changes its shape from night to night. There also seems to be a cycle to these changes. Every month the Moon goes through a cycle of phases from new (cannot see it) to full (can fully see.) It takes 27.3 days for the Moon to complete one orbit of the Earth. The Earth also moves relative to the Sun at the same time the Moon is revolving around the Earth, so the Moon must complete more than one orbit to return to the same phase as seen from Earth. The time that the Moon takes to complete one cycle or “phases of the Moon” is 29.5 days.

Each spot on the Moon is subjected to two weeks of day light, during which the surface temperature reaches about 100 degrees centigrade (boiling point). The next two weeks are night and temperatures fall to -170 C. The Moon has no atmosphere. There is evidence that there is water ice in some deep craters near the Moon's south pole which are permanently shaded.

There are two primary types of terrain on the Moon: the heavily cratered and very old highlands and the relatively smooth and younger mare (or maria). The mare (which comprise about 16% of the Moon's surface) are huge impact craters that were later flooded by molten lava. Most of the surface is covered with regolith, a mixture of fine dust and rocky debris produced by meteor impacts. For some unknown reason, the mare are concentrated on the near side.

PROCEDURE:

1. Read the book *The Moon Seems to Change* to the class. The book attempts to show the students why the Moon changes its shape. The book includes a demonstration using a flashlight and an orange, showing the different positions as shown on the student's worksheet. You may want to try this with the class, either individually or as a group. This visualization helps students to understand the movements involved with the phases of the Moon.


Not quite a full Moon.

2. Have the students complete the worksheet. Have them color the bright part of the Moon in yellow, as well as the sunlight arrows. Have them draw arrows to indicate the direction of the Moon's revolution around the Earth. The arrows should go counterclockwise. If the students seem to grasp the concept, you can also have them draw the Moon's rotational axis and direction of spin (also counterclockwise).

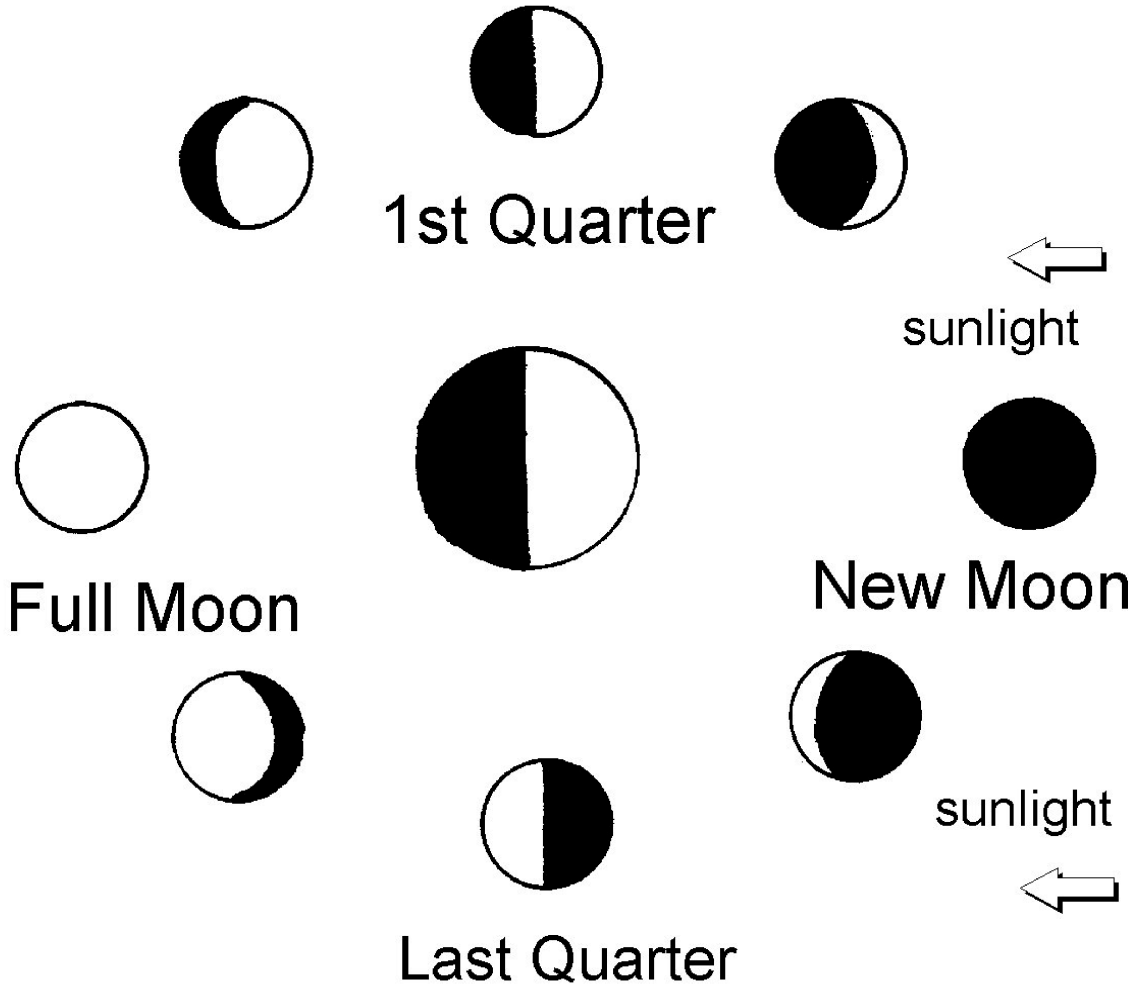
3. If you have internet access you can view all the phases of the Moon from 1800 to 2199 AD, even the day you do this lesson!

http://tycho.usno.navy.mil/vphase.html

PHASES OF THE MOON

takes 29.5 days to complete all the phases of the Moon
Moon revolves around the Earth once every 27.3 days

Color the Moon yellow. Draw arrows to show the way the Moon moves around the Earth.



UNIVERSE CYCLE - EARTH (2)

LAB

Students use a globe to observe the Earth's surface features.

OBJECTIVE:

1. Exploring the characteristics of the Earth's surface.
2. Comparing the surface of the Earth.

VOCABULARY:

continent
ocean
relief

MATERIALS:

worksheet
Inflatable World Globes

BACKGROUND:

The Earth and Moon are a unit that revolves around the Sun. The Moon has no surface water or atmosphere like the Earth, and is geologically inactive. The Earth is a very different place. The Earth, especially its surface, change continually over time.

Several factors contribute to changes in the Earth's surface. Plate tectonics slowly and constantly reshapes the configuration of the continents and ocean basins, as well as raising mountains forming volcanoes. When volcanoes erupt, the lava forms different shapes on the surface. Weather and the water cycle bring rain, snow, and ice to the surface of the Earth. Erosion and transport of loose material from the rain and ice slowly wear mountains and fill in low areas due to gravity.

In this activity, students will begin to look at the Earth in more detail. Locate and name the major land and ocean areas of the Earth's surface. You may wish to emphasize that these areas change through time.

PROCEDURE:

1. Divide the class into groups of two or three, depending on the number of globes you have available. Give each group an inflatable globe. If you have other relief maps, especially of your local area, you may wish to have them available for the students to examine.

2. Have the students answer the questions on their lab sheets by examining the

globes. Review the questions with the class in advance to make sure they understand what to do.

3. Here are answers to the questions. These are specific to the inflatable globe. Other globes may have more or less information. If you use a different globe, be sure to review the information.

1. *Is there more land or water?* More water (71%)
2. *How many oceans are there?* Four

Name them: Atlantic, Pacific, Indian, Arctic (However, the globe shows a "Southern Ocean" and omits Arctic - You decide how to handle this discrepancy. Other globes may be different.)

3. *How many seas are there?* Twenty five.

Name them: Mediterranean Sea, Black Sea, Caspian Sea, Aral Sea, Arabian Sea, Red Sea, Baltic Sea, Greenland Sea, Norwegian Sea, North Sea, Labrador Sea, Antilles Sea, Beaufort Sea, Siberia Sea, Laptev Sea, Sea of Okkhotsk, Sea of Japan, Philippine Sea, East China Sea, South China Sea, Timor Sea, Coral Sea, Ross Sea, Amen Sea, Wedell Sea.

4. *How many continents are there?* Six

Name them: Africa, Australia, North America, South America, Eur-Asia, Antarctica. Although most books will say seven, it is difficult to divide Europe and Asia into two land masses. You decide if you want six or seven, be sure to explain your reasoning tho the class.

5. *Which continent has the most mountains?* Eur-Asia
6. *Which continent has the most ice?* Antarctica
7. *Which continent has the most tropical forests and jungles?* South America
8. *Which ocean has the most islands?* Pacific

UNIVERSE CYCLE - EARTH (2) LAB

PROBLEM: Can you get information from a globe of the Earth's surface?
PREDICTION:_____

MATERIALS: inflatable world globe
PROCEDURE: Look at the globe and answer the following questions. Discuss the answers with your partner.

1. Is there more land or water on the Earth's surface?
_____

2. How many oceans are there? _____ Name them.
_____
_____
_____

3. How many seas are there? _____ Name them.
_____
_____
_____

4. How many continents are there? _____ Name them.
_____
_____

5. Which continent has the most mountains?
_____

6. Which continent has the most ice?
_____

7. Which continent has the most tropical forests and jungles?
_____
_____

8. Which ocean has the most islands?
_____

CONCLUSION: Are globes good places to get information about the Earth's surface?
_____
_____

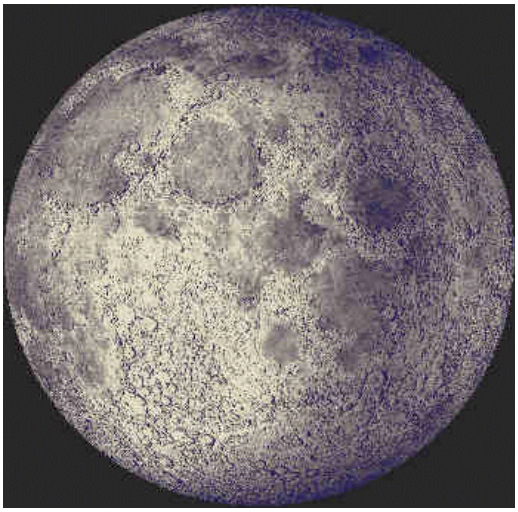
UNIVERSE CYCLE - EARTH (2)

POST LAB

Students identify surface features of the Moon.

OBJECTIVE:

1. Comparing the Earth with the Moon.
2. Exploring features of the Moon.



VOCABULARY:

crater
mountain

MATERIALS:

worksheet

BACKGROUND:

The surface of the Moon is very different from the Earth's surface. There is little or no tectonic movement on the Moon like on the Earth. The Moon's surface has remained the same for billions of years. The Moon lacks water and an atmosphere. The weathering, erosion, and tectonic processes common to the Earth do not happen on the Moon.

The Moon has many surface features that we do not have on Earth. The following features can be identified on the Moon's surface:

MARE or "SEAS" - These are relatively smooth, dark, and large areas that are filled with lava. The mare formed when the craters formed by large asteroid impacts were filled by lava. Most mare are more than 3 billion years in age. They can be easily seen on the Moon using a telescope from Earth.

Lunar rock

MOUNTAINS AND MOUNTAIN RANGES - The Moon's mountains are large, rounded "bumps," which look much like old, eroded mountain ranges on Earth. The Moon's mountains are even older than the mare, dating back as far as 4.4 billion years.

CRATERS - These roughly circular depression in the surface formed when meteoroids struck the Moon at high speeds. The Moon's surface has hundreds of thousands of craters. The craters can be large (hundreds of kilometers) to as small as one meter.

RAYS - Rays are bright streaks of debris that radiate from some large craters. They may be as long as 3000 km.

RILLS - These are cracks in the surface of the Moon, probably produced by moving of the surface similar to faulting on the Earth.

PROCEDURE:

1. In this activity, the students will first find features on the Moon, and then compare them with the Earth. Remind students that the Moon is much smaller than the Earth, and revolves around the Earth, much as the Earth/Moon system revolves around the Sun.

2. Explain to the students the different features that you would like them to locate. You should include most of the features described in the background, depending on the resolution of the Moon maps you have for the students to examine.

3. Give the students the worksheets and have them try and locate features. You might start by asking them to look in the same areas, and have the student who finds a certain feature first raise his or her hand. This will help the students look for detail. You may wish to have the students work with a partner. You may want them to circle the areas you ask them to locate and identify the feature.

4. Ask students the following questions. These are only suggestions. You may also want the students to compare and contrast the two sides of the Moon.

A. Locate two mare on the Moon map and list them on another piece of paper. Are mare large or small? Are there more mare on the eastern western part of the Moon? (The many SEAS OR MARE are more prominent on the western portion of the Moon. There are many named ones for students to choose from. They are large.)

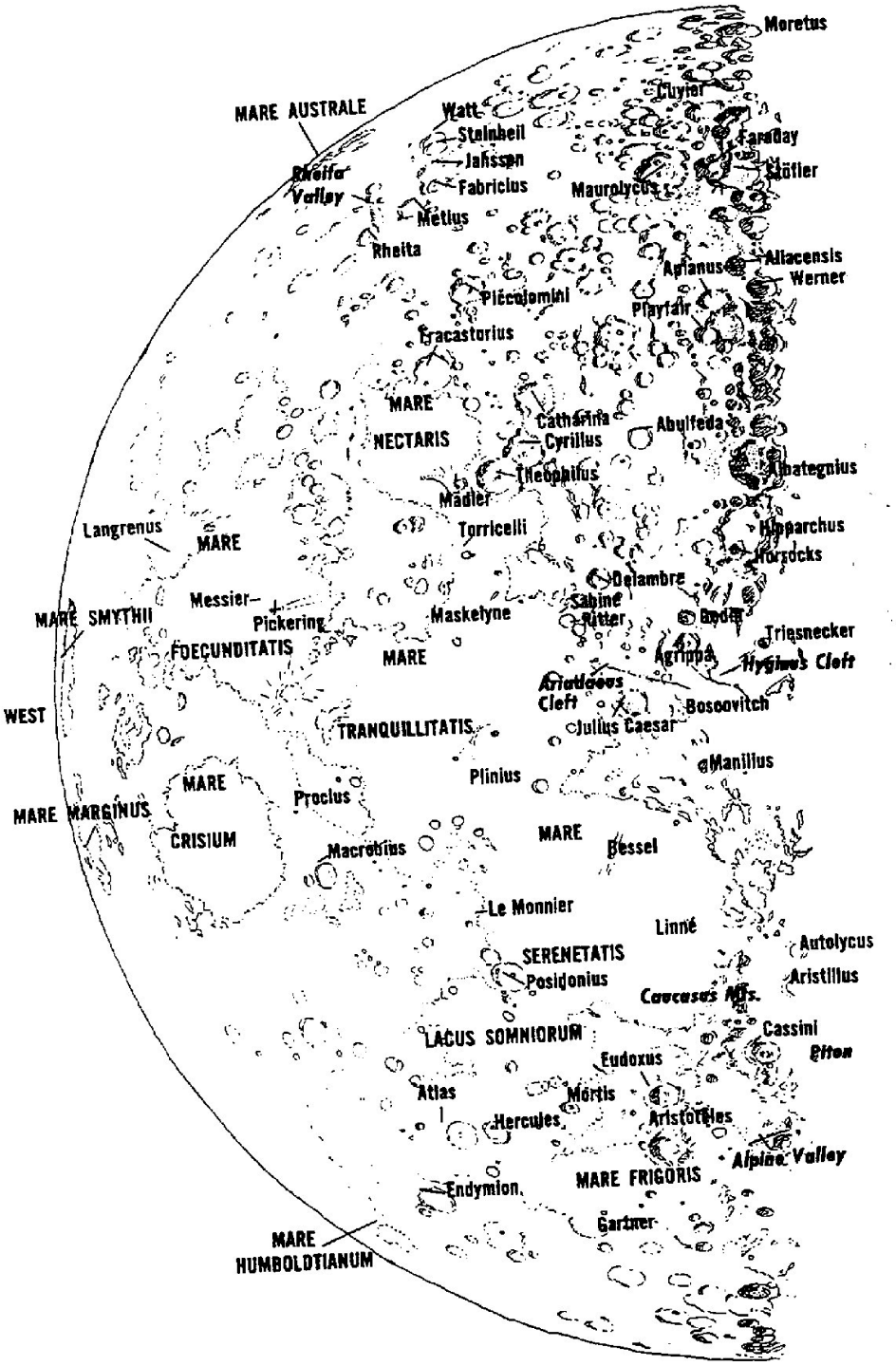
B. Locate and name a mountain range on the Moon. (There are only 3 mountain ranges labeled on most Moon maps: the Caucasus Mts., the Apennine Mts., and the Jura Mts.)

C. Find and name three craters. Are there many or few craters on the Moon? (CRATERS are the round depressions on the map. Many are named.)

D. Name two craters that are have rays. (RAYS are prominent on the eastern portion of the Moon, especially radiating from the craters Copernicus, Kepler, and Herodotus.)

E. Find and name one rill. (RILLS are difficult to locate. On the western portion, Hyginus Cleft is one. On the eastern portion, the Straight Wall is a rill.)

CRATERS AND WALLED PLAINS
WESTERN PORTION



UNIVERSE CYCLE - EARTH (2) POST LAB

CRATERS AND WALLED PLAINS
EASTERN PORTION