

## Week 1

Aside from the Earth, the Sun and the Moon are the most prominent parts of the Solar System. This week, your students start observing them, and recording their observations.

As the weeks pass, the activities will become more demanding, your students will become increasingly sophisticated, and they will add more and more depth and detail to their observations. For now, however, what matters is that they develop some curiosity, get used to keeping an eye towards the heavens, and learn good record-keeping habits.

This kit does not deal with galaxies, black holes or any of the other objects that lie beyond the limits of the Solar System. However, your students will begin star-gazing this week. This is because familiarity with the stars and constellations which serve as signposts in the night sky is needed for a good understanding of the apparent motion of the Moon and planets.

To liven up the class, read your students some stories and myths about the Sun, Moon and stars. One possible source is THE MAN IN THE MOON: SKY TALES FROM MANY LANDS, by Alta Jablow and Carl Withers (Winston, 1969). These stories show that people of many different cultures all over the world have made up wonderful stories about the sky. They are an excellent springboard for creative writing.

Before starting the first lesson, you may want to ask your students for all the words they know about the Solar System.

Write the words on a large piece of paper. If you repeat this exercise after the last lesson, your students will probably come up with a much longer list, and be conscious of how much they have learned.

## Lesson 1

## THE MOON CALENDAR

## OBJECTIVES:

- \* To raise questions about the Moon and its phases.
- \* To start to observe the Moon in the sky and keep daily records.

GRADES: 4 and up.

## SCHEDULING:

A good time to start is on the day of the Last Quarter Moon (give or take a day or two). At that time, the Moon is visible during school hours, and the first observations will happen in your presence so you can demonstrate and explain the record keeping procedure.

Of course, you must start on a clear day!

Plan to continue this activity (with various additions introduced gradually), for at least six weeks. Use the first few minutes of school every day to listen to the students' comments about their observations. Try to be flexible enough to accommodate a longer discussion once in a while, should the need arise.

## PREPARATION:

You may feel more comfortable teaching this lesson after having done some Moon-watching yourself for a few weeks. But this is not necessary: you can learn along with your students. However, make sure you can find the Moon on the first day of this activity, since your students may need help.

## STUDENT SHEETS:

- \* Moon Calendar
- \* Moon Calendar Instructions

## DISCUSSION:

There are probably many misconceptions about the Moon among your students. You should not correct them at this stage. You should even avoid praising "good" answers. Instead, tell the students that their own experiences and observations will clear up most of these questions within a few weeks. Some will be solved very quickly, others will take more time.

Write the most controversial questions on large pieces of paper, and display them on the bulletin board until the class agrees on an answer.

- \* Does the Moon rise whenever the Sun sets?
- \* Can one see the Moon in the daytime?
- \* Does the Moon seem to move in the sky? Does it rise and set? Where? When?
- \* What is the shape of the Moon? What does it seem to be? Does it change? Why?

For your reference, the answers to these questions are in the "Conclusions" section below.

## ACTIVITY:

Take the class outside to look at the Moon. Make sure that they bring paper and pencils in order to draw it.

Back in the classroom, hand out the Moon Calendars and the accompanying Instructions. Go over the instructions. Check that the students enter the dates correctly. (If the last one is

incorrect, they made a mistake along the way! Make sure they know the number of days in the current calendar month. Have extra copies on hand!)

Explain that the shape of the Moon will be recorded by shading in the area you DON'T see, leaving the Moon's shape in white. Demonstrate this on the chalkboard. Have them draw the Moon in the appropriate box on the Calendar. (Allow them to go back out if necessary.)

Emphasize that they should do this every day until the calendar is full. If they forget to look or cannot find the Moon, they should NOT enter a guess in the calendar. Discourage "cheating" by looking up the shape of the Moon in the daily paper, or on a calendar or almanac: the point of the activity is to use the students' own observations as a basis for learning, so that they will be able to predict the phases of the Moon.

Sometimes, no one will be able to find the Moon for a few days. (This will always happen at the *Time* of the New Moon, but it may happen at other times too, especially if the weather is bad.) Encourage the students to keep looking. With the help of the ALMANAC and SKY CALENDAR, you may be able to suggest a good time and direction to look for it.

#### CONCLUSIONS:

As the weeks go by, the following points should become clear:

- \* The Moon rises (roughly) in the East, and sets (approximately) in the West.

- \* It does not rise or set at the same time every day.
- \* The Moon's shape changes continuously, not suddenly.

More conclusions will become possible as the observational assignments become more sophisticated in the coming weeks.

COMMENTS:

- \* Some students have trouble remembering to look for the Moon, especially at first. Others become nearly fanatical about it, and go out several times a day. The morning conversations at school provide an opportunity for the enthusiasts to communicate some of their excitement to the others.
- \* Some students may notice differences in the color of the Moon. The Moon is often reddish when it is low in the sky, because its light must cross more atmosphere to get to us. This is analogous to the redness of the sunset. It is due to the fact that blue light gets scattered by the atmosphere, while red light does not. (It is not important for students to understand this idea.)
- \* The size of the Moon also seems to vary. A rising Full Moon often seems unexpectedly large, <sup>perhaps</sup> ~~because~~ because of its apparent proximity to various landmarks.
- \* You may want to make a large Moon Calendar for the classroom bulletin board, and have students take turns entering their observations every morning. Such a wall calendar can help focus discussions about the Moon and its cycle.
- \* The Elementary Science Study unit WHERE IS THE MOON? (Webster - McGraw Hill) originally inspired me to teach astronomy to children. Read it, as well as the companion student text, WHERE

HAS THE MOON?, for a different approach to Moon-watching.

\* A little puzzle: rearrange the letters of "Moon starrer" to make a word with a related meaning. (Answer: "astronomer").

### MOON CALENDAR INSTRUCTIONS

Write your name and the months on your Moon Calendar. Fill in all the dates.

For the next six weeks, look for the Moon every single day and night!

\* If you cannot find it, or forget to look, put a question mark in the circle for that day.

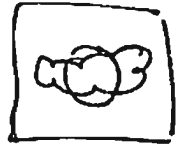
\* If it is cloudy all day, put a cloud over the circle.

\* If you find the Moon, indicate the time in the corner. Don't forget "am" or "pm". Show the shape by shading the part of the Moon you don't see, and leaving the shape you do see unshaded. (See figure.)

\* If the Moon has an unusual color, color it on the sky calendar.



It was cloudy



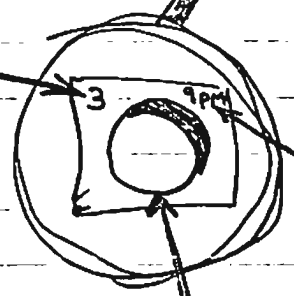
The Moon was not seen

MON	TUE	WED	THU	FRI	SAT	SUN
○	○	○	○	○	○	○
○	○	○	○	○	○	○
○	○	○	○	○	○	○
○	○	○	○	○	○	○
○	○	○	○	○	○	○
○	○	○	○	○	○	○
○	○	○	○	○	○	○

Months

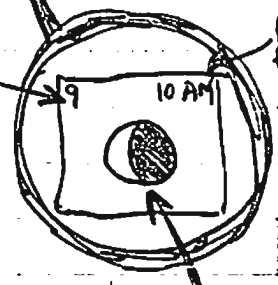
Observer's Name

Date



Date

time



~~time~~ time

Shape of moon:

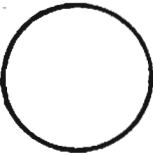

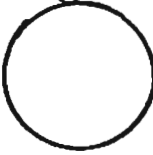
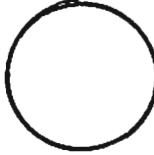
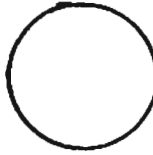
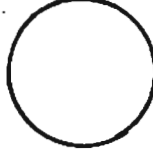
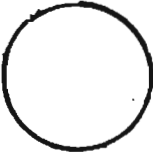
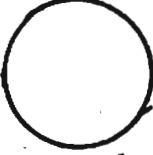
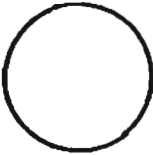
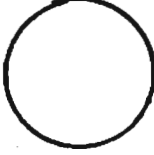
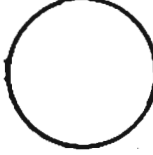
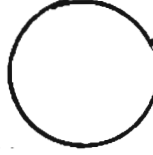
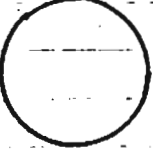
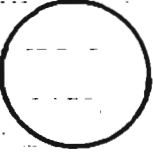
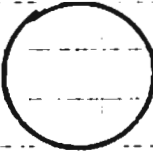
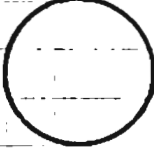
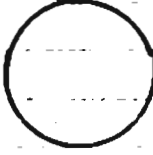
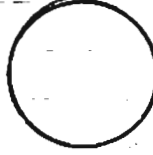
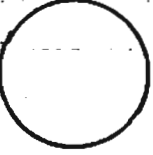
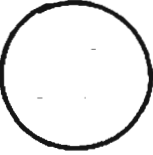
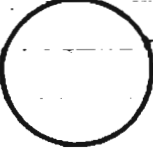
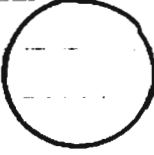
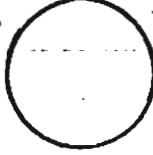
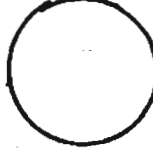
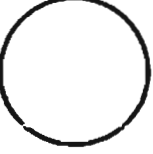
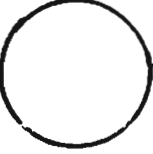
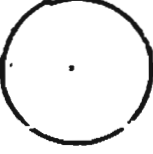
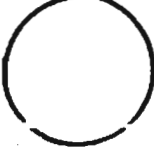
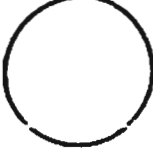

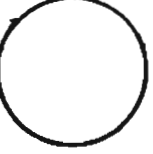
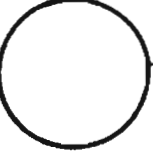
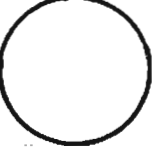
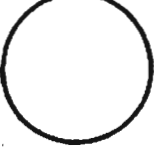
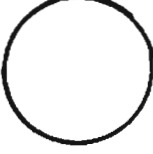
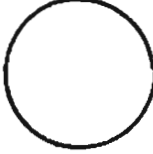
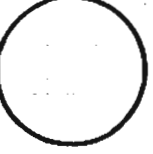

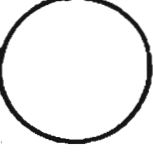
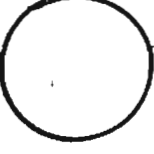
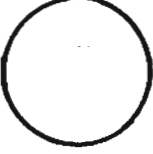
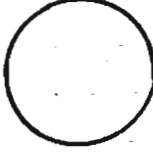


Shape of the moon:



Name: \_\_\_\_\_

# Moon Calendar

Saturday						
Friday						
Thursday						
Wednesday						
Tuesday						
Monday						
Sunday						

Months of: \_\_\_\_\_

LI/P9

SUN	13	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
MON	14	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
TUES	15	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
WED	16	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
THURS	17	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
FRI	18	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁
SAT	19	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁	☁

MOON

SPC

STARS

SPC  
STARS