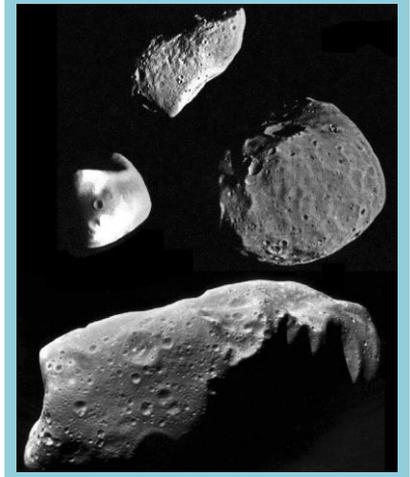
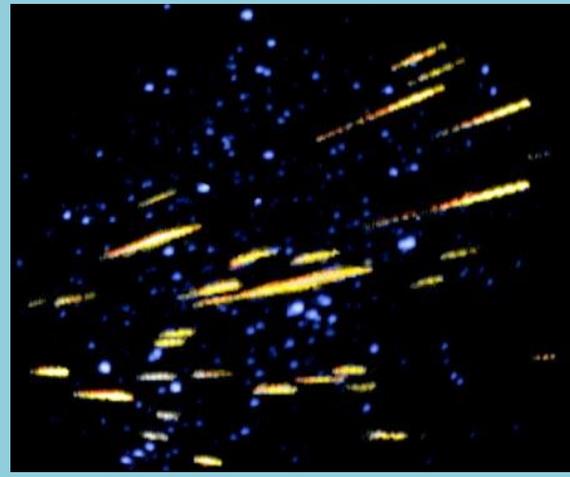


# Movers in the Sky: Comets, Meteors & Asteroids



## Some Definitions Associated with Movers in the Sky

1. Balls of rock and ice, sometimes called dirty snowballs, with trails of debris blown outward by the Sun are known as **comets**.
2. The solid stable main part of a comet is called its **nucleus**.
3. The tail of a comet always faces away from the Sun because of the **solar wind**.
4. Two types of comet tails include dust and **ion**.
5. Comet Wild2 was visited by the NASA Mission **Stardust**.
6. The substance used in the above mission to collect particles is called **aerogel**.
7. Comet Tempel 1 was visited by the NASA Mission **Deep Impact**.
8. Small, solid bodies moving within the solar system are called **meteoroids**.
9. The correct name for the misnomer “shooting star” is **meteor**.
10. The solid remains of the above that falls to the Earth is called a **meteorite**.
11. A large, brilliant meteor brighter than the planet Venus is called a **Fireball**.
12. When the above explodes with a thunderous sound then it is called a **Bolide**.
13. Heavy displays of meteors that recur from year to year that appear to come from the same general point in the sky is called a **meteor shower**.
14. Meteors that can be seen on any given night that are not associated with any particular meteor shower are called **sporadic** meteors.
15. The point in the sky from which the meteors appear to come is called the **radiant**.
16. The best time to observe many meteors is **approaching dawn**.
17. The best way to observe meteors is with **unaided eyes**.
18. Most asteroids can be found in an asteroid belt between Mars and **Jupiter**.
19. Asteroids whose orbits cross the Earth’s orbit are called **Apollo** asteroids.
20. NASA's Near Earth Asteroid Rendevous (NEAR) Mission flew by the asteroid named **Eros**.
21. The asteroid with a moon named Dactyl orbiting it is called **Ida**.
22. Asteroids colliding with the Earth can cause craters, climate change, and even **species extinction**.

**For more information about these kinds of programs please visit the web site at [www.lookuptothestars.com](http://www.lookuptothestars.com)**

# Daily Observation Log

**Observer:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Time:** \_\_\_\_\_ am  
\_\_\_\_\_ pm **Duration:** \_\_\_\_\_ min

**Sky:** 0 1 2 3 4 5 (circle one) **Seeing:** 0 1 2 3 4 5 (circle one)

**Constellation(s):** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Star(s):** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

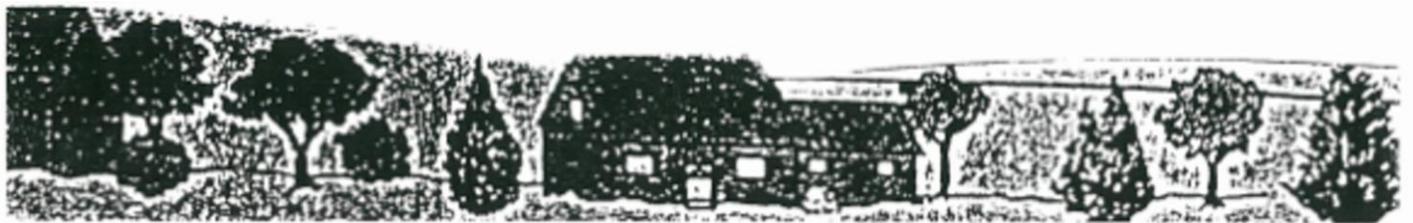
**Planet(s):** \_\_\_\_\_

**Object(s):** \_\_\_\_\_

**Phenomena:** \_\_\_\_\_

**Observational Method:** unaided eye    paper tube    binoculars    telescope    (circle one)

**Drawing:**



# Instructions for Completing Daily Observation Log

**Observer:** Please print your full name

**Date:** Record current month/day/year (i.e. 01/08/2009)

**Time:** Record the time you began the observation and circle AM or PM

**Duration:** Record the total number of minutes you actually made your observation

**Sky:** Circle one number that best represents the sky from clear to completely overcast. 0 = clear; 1 = a few small clouds; 2 = partly cloudy; 3 = sky 50% cloud-covered; 4 = few breaks in clouds; 5 = completely overcast

**Seeing:** Circle one number that best represents the seeing conditions from excellent to poor. "Seeing" is a term used by astronomers to describe the steadiness of the atmosphere. One method of determining how steady or unsteady the atmosphere is, due to air currents and temperature changes, is by studying the brighter stars. Bright stars that appear to "twinkle" indicate turbulence in the layers of air in the atmosphere. Rate the seeing conditions on a scale of 0 for perfectly steady to 5 for stars that appear to "dance" in the sky.

**Constellation(s):** List any constellation you are able to identify in the night sky.

**Star(s):** Write the name of each brightest star you are able to identify by consulting a star chart or atlas.

**Planet(s):** Write the name of any planet you identify by referring to current data available giving its location.

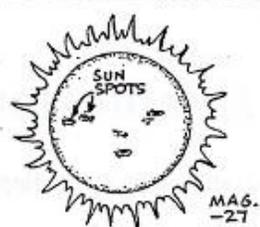
**Object(s):** Record the number and types of objects seen in the sky. Examples include meteors ("falling or shooting stars"), satellites, comets, asteroids, etc.

**Phenomena:** Any form of sky glow, such as aurora or the Milky Way, may be recorded

**Observational Method:** Circle the method of observation used. More than one per observation period can be utilized.

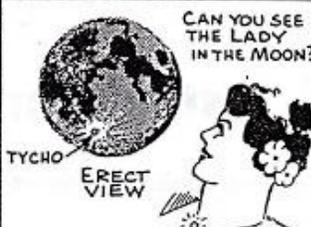
**Drawing:** Draw the moon phase (amount of sunlit portion) if visible. Also draw in anything recorded for that day's observation. You should draw in boundary lines separating different parts of the sky and include the direction abbreviated (i.e. SW) for each segment.

# The Sky Show



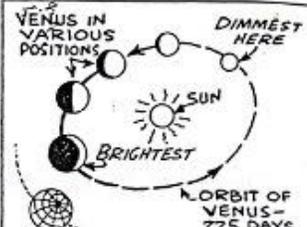
## THE SUN

... INTERESTING TELESCOPE OBJECT AT 40x TO 70x BUT YOU MUST USE A SUN FILTER TO AVOID SERIOUS INJURY TO YOUR EYE. THE SUN SPOTS ARE EASY TO SEE



## THE MOON

MAGNITUDE -12 WHEN FULL IS 190,000 TIMES BRIGHTER THAN FIRST MAGNITUDE STAR. CRATER TYCHO (TIE-0) IS ON SOUTH SIDE - MOST PHOTOS ARE SHOWN INVERTED



## VENUS

LIKE ALL OF THE PLANETS, VENUS ORBITS AROUND THE SUN AND IS LIGHTED BY THE SUN. ON HER NEAR APPROACHES TO THE EARTH SHE IS BRILLIANT AT -4 MAGNITUDE



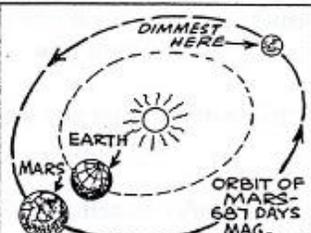
## JUPITER

BIG JUPE IS THE EASIEST PLANET TO SEE -- ALWAYS BRIGHTER THAN -1/2 MAG. HIS FOUR BRIGHTEST MOONS OF MAG. 6 SHUTTLE BACK AND FORTH, CHANGING NIGHTLY



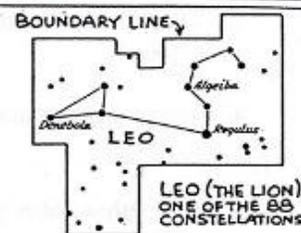
## SATURN

SATURN IS THE PRETTIEST PLANET. THE RINGS ARE SEEN PLAINLY AT 40x ALTHOUGH INVISIBLE WITH 7x BINOCULAR. WITH HIGHER POWER YOU MAY BE ABLE TO SEE CASSINI'S DIVISION



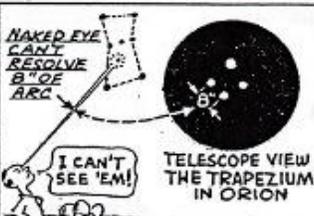
## MARS

RED MARS MAKES A NEAR APPROACH TO THE EARTH EVERY OTHER YEAR, AND AT SUCH TIMES SOME SURFACE DETAIL CAN BE SEEN WITH TELESCOPES AT 200-300x



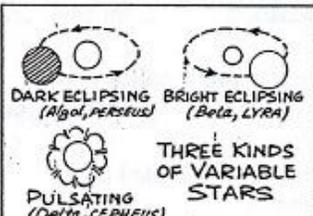
## CONSTELLATIONS

A CONSTELLATION IS A GROUP OF STARS, USUALLY FORMING SOME KIND OF PATTERN OR "PICTURE." PROPERLY, A CONSTELLATION IS A SPECIFIC AREA OF THE SKY



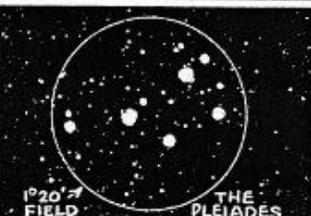
## DOUBLE STARS

ONE OUT OF 15 STARS IS A DOUBLE OR MULTIPLE STAR AND ABOUT 500 OF THESE FROM 2 SECONDS TO 1 MINUTE OF ARC SEPARATION CAN BE "SPLIT" WITH SMALL TELESCOPES



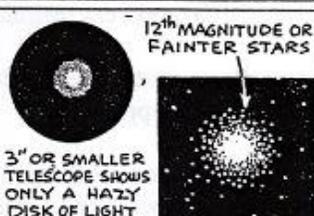
## VARIABLE STARS

A VARIABLE STAR VARIES IN BRIGHTNESS. THE CHANGE TAKES 2 DAYS (AVERAGE), MAKING THE V.S. A POOR "SHOW" OBJECT ALTHOUGH IDEAL FOR SYSTEMATIC STUDY



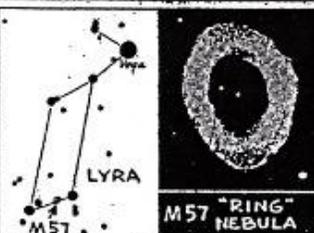
## OPEN CLUSTERS

OPEN CLUSTERS OF STARS ARE A FAVORITE TARGET FOR THE TELESCOPE. 40 TO 60x IS ENOUGH FOR MOST GROUPS. POPULAR PLEIADES CLUSTER IS A FINE BINOCULAR OBJECT



## GLOBULAR CLUSTERS

A GLOBULAR CLUSTER IS A BALL OF STARS. INDIVIDUAL STARS ARE FAINT AND NEED 6" OR MORE APERTURE FOR RESOLUTION. M13 AND M22 ARE TWO BRIGHTEST



## PLANETARY NEBULAE

PLANETARY NEBULAE ARE SO NAMED ONLY BECAUSE THEY ARE ROUND LIKE PLANETS. THEY ARE LUMINOUS GAS CLOUDS AND ARE A PART OF OUR GALAXY



## DIFFUSE NEBULAE

A LARGE DIFFUSE GAS CLOUD LIGHTED BY THE STARS IN ITS VICINITY IS KNOWN AS A BRIGHT DIFFUSE NEBULA. M42 IN ORION IS IMPRESSIVE, EASILY SEEN WITH ANY TELESCOPE



## EXTERNAL GALAXIES

GALAXIES ARE COMPLETE STAR SYSTEMS LIKE OUR OWN GALAXY. ALL ARE VERY DISTANT. M81 SHOWN IS ABOUT AS BRIGHT AS A STAR OF 9th MAGNITUDE

NO.	TYPE	CONS.	M.
M44	OPEN CL.	CANCER	3.7
M41	OPEN CL.	CANIS MAJ.	4.6
M24	OPEN CL.	SAGR.	4.6
M31	GALAXY	ANDR.	4.8
M35	OPEN CL.	GEMINI	5.3
M13	GLOBULAR	HERCULES	5.7
M22	GLOBULAR	SAGR.	5.9
M8	DIFFUSE NEB.	SAGR.	-
M42	DIFFUSE NEB.	ORION	-
M57	PLANETARY	LYRA	9.3

## MESSIER OBJECTS

FRENCH ASTRONOMER, CHARLES MESSIER, MADE UP THE FIRST LIST OF SKY OBJECTS OTHER THAN STARS (1784). ALL OF THE 103 M-OBJECTS CAN BE SEEN WITH SMALL TELESCOPES

# Cook Up a Comet



Materials: 1 gallon crushed ice, large mixing bowl, insulated rubber gloves, cup of dirt, small cup of pebbles, clean plastic garbage bag, large wooden spoon

Directions: With both gloves on, pour crushed ice into mixing bowl and add dirt and pebbles. Mix all together in bowl using large wood or plastic spoon. Using your hands with gloves on, collect all the mix you can between your hands, squeeze tight, and make a dirty snowball.

Years ago, a scientist named Fred Whipple coined the term “dirty snowball” when describing a comet nucleus.

