Astronomy for Everyone

Size & Scale of the Universe

A virtual journey into the cosmos looking at the very small and the very large!

For more information about these kinds of programs please visit the web site at 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

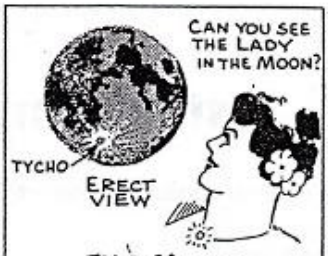
Observational Method: Circle the method of observation used. More than one per observation period can be utilized.

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

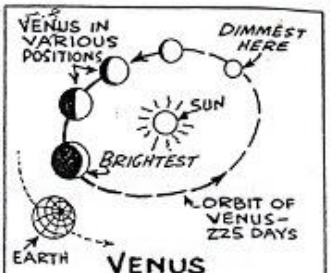
THE SUN

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



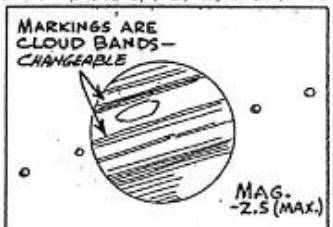
THE MOON

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



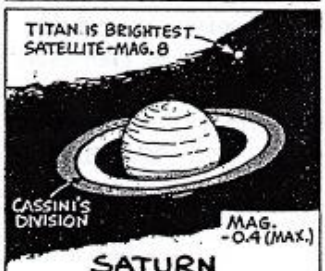
VENUS

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



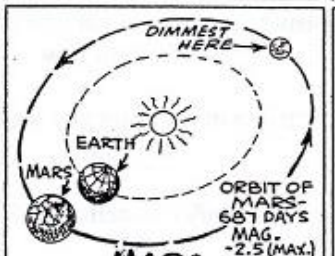
JUPITER

BIG JUPE IS THE EASIEST PLANET TO SEE -- ALWAYS BRIGHTER THAN -1½ MAG. HIS FOUR BRIGHTEST MOONS OF MAG. 6 SHUTTLE BACK AND FORTH, CHANGING NIGHTLY



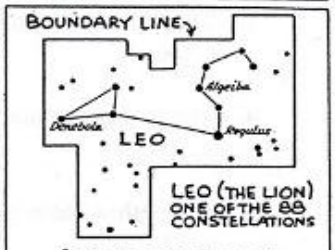
SATURN

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



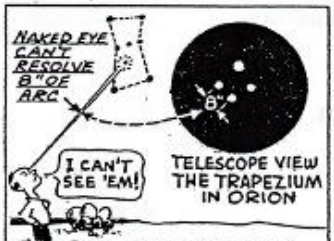
MARS

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 200-300×



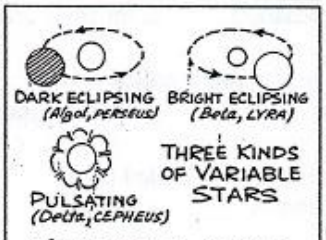
CONSTELLATIONS

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



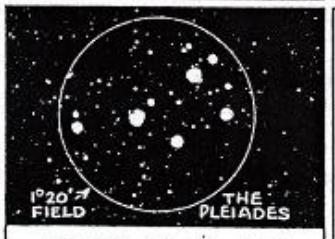
DOUBLE STARS

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



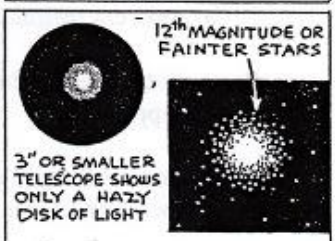
VARIABLE STARS

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



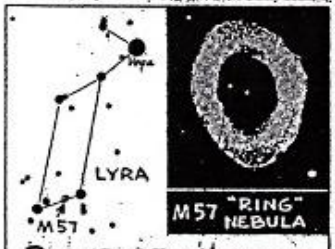
OPEN CLUSTERS

OPEN CLUSTERS OF STARS ARE A FAVORITE TARGET FOR THE TELESCOPE. 40 TO 60× 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

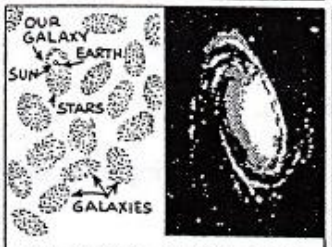


PLANETARY NEBULAE

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

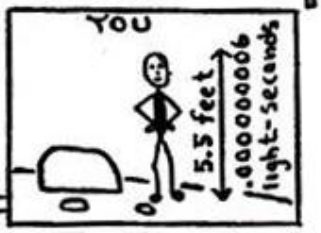
NO.	TYPE	CONS.	M.
M44	OPEN CL.	CANCER	3.7
M41	OPEN CL.	CANIS MAJ.	4.6
M24	OPEN CL.	SAGR.	4.6
M31	GALAXY	ANDR.	4.8
M35	OPEN CL.	GEMINI	5.3
M13	GLOBULAR	HERCULES	5.7
M22	GLOBULAR	SAGR.	5.9
M8	DIFFUSE NEB.	SAGR.	—
M42	DIFFUSE NEB.	ORION	—
M57	PLANETARY	LYRA	9.3

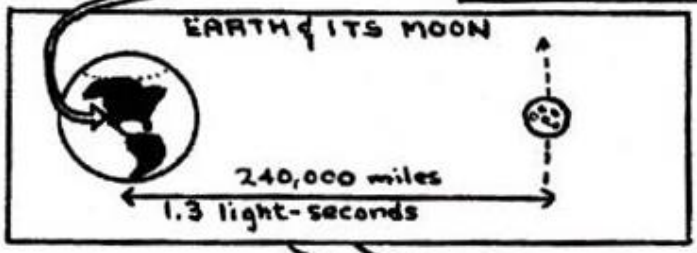
MESSIER OBJECTS

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

the UNIVERSE in a NUTSHELL — or WHAT IS YOUR PLACE IN THE COSMOS?

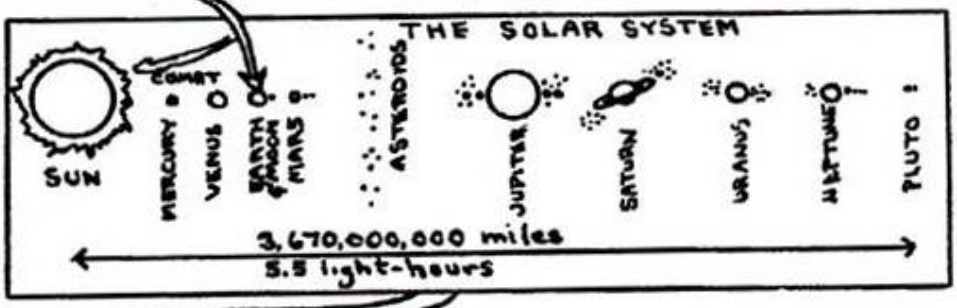
1. YOU are an inhabitant of a planet called EARTH.

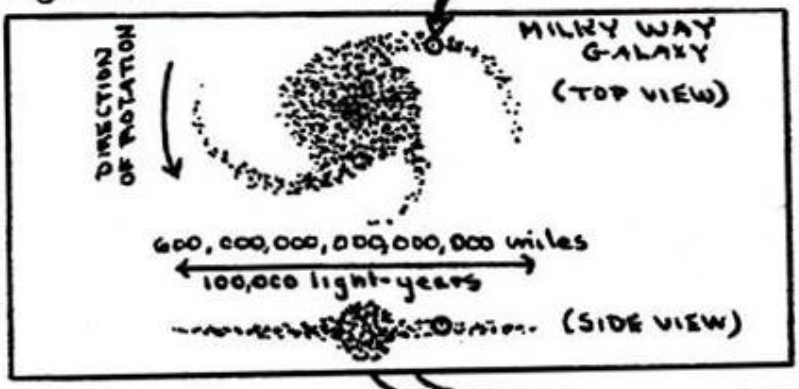




2. EARTH is a rather small planet orbited by one moon.

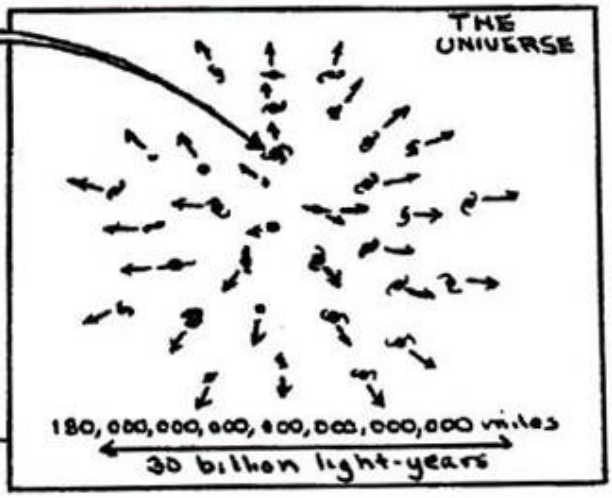
3. Earth is one of nine planets that, along with dozens of moons and thousands of asteroids and comets, orbit an average-sized star called the Sun. The Sun and its family form the Solar System.





4. The Sun is just one of about 200 billion stars that form a swirling, spiral galaxy called the Milky Way. Besides stars, the Milky Way contains huge amounts of gas and dust.

5. The Milky Way is just one of billions of galaxies that make up an expanding universe.



Feel small?

Survival On the Moon

Characteristics of an Airless World:

- A world without an atmosphere
- No air
- No living things
- No weather or climate
- Searing hot or incredibly cold
- No dust particles or water droplets
- Sky is always black
- No atmospheric pressure
- Very little weathering and erosion
- Objects appear much closer than they are
- No sounds and no scents

You and four other crew members have just crash-landed on the sunlit side of the Moon a distance of 300 kilometers from the base ship. Most of the equipment on board the rocket craft has been destroyed by the rough landing. You must reach the base ship. In addition to your spacesuits, your crew was able to remove the following items from the rocket craft:

You are to rank in order of importance each item listed below beginning with #1-first priority, #2-second priority, etc. in order to have the best chances of surviving the long trip to the base ship.

Priority #

☐	• 4 packages of food concentrate
☐	• Two 50 kg tanks of oxygen
☐	• Portable heating unit
☐	• Case of dehydrated milk
☐	• Large piece of parachute fabric
☐	• Solar-powered receiver-transmitter
☐	• First-aid kit
☐	• 20 m nylon rope
☐	• 20 L of water
☐	• Magnetic compass
☐	• Flashlight
☐	• Star chart
☐	• 3 signal flares
☐	• Box of matches
☐	• Two 45-caliber pistols

Now join with four other crew members and come up with a consensus ranking of the fifteen items in order of importance for your crew to survive the trip to the base ship. Make sure to discuss your reasoning with each other since your life depends on it.