



*The Wonderful Sky* is a program based on the celestial objects you can see outside with your eyes alone. Among the topics discussed are the Sun, the Moon, meteors, northern lights and visible planets. A series of constellations will also be pointed out to coincide with the season. Since *The Wonderful Sky* is a live presentation as opposed to a taped presentation, it is easily geared to the specific age group attending. There is always plenty of room for questions and answers. We encourage active group participation.

## VOCABULARY

- 1. Constellations:** Imaginary, dot-to-dot pictures drawn using the stars as the dots. These are used to make a map of the nighttime sky. There are 88 constellations in all. There are also many interesting stories told about these pictures in the sky.
- 2. Meteor:** A small rock, pebble or piece of dust that falls to the Earth and burns or vaporizes due to friction with Earth's atmosphere. Floating in space, we call these rocks *meteoroids*; burning in the atmosphere, they are called *meteors*; and on the ground, they are called *meteorites*. Other favorite names for meteors are shooting stars and falling stars.
- 3. Mare:** Flat lands on the Moon's surface, the darker areas seen on the Moon when observed. Mare comes from the Latin word for sea. Long ago some people thought there were seas of water on the Moon. The plural form of mare is maria.
- 4. Prominence:** A column of hydrogen gas arching high above the Sun's surface held in place by strong magnetic fields emanating from sunspots.
- 5. Sunspots:** Magnetic storms on the Sun. They appear as darker regions on the Sun.
- 6. Satellite:** Any object that orbits another object. For example: the Moon is a natural satellite of the Earth, but we have also placed hundreds of man-made satellites into Earth orbit as well. It's possible to see many man-made satellites with the unaided eye.
- 7. Aurora Borealis:** These rippling lights seen in the northern skies, are caused by powerful magnetic storms on the Sun. When the energy from these storms reaches Earth, it interacts with the upper atmosphere near the north and south poles. This causes the air to glow, creating the northern lights, also called the aurora borealis.

## STUDY QUESTIONS ???? !!!!

Below are some questions that will be answered during your visit with the *Northern Stars Planetarium*. See how many questions your students can answer correctly before our visit!

1. What is a planetarium? (a room that produces an artificial sky)
2. What planets (if any) can you see tonight if its clear?
3. What causes the northern lights? (see vocabulary list)
4. What caused the mare on the moon? (lava)
5. What is a falling star? (a meteor or small rock burning in the air)
6. What causes craters? (meteorite) Are there any craters on the Earth? (yes) Why or why not?
7. What is a star? (a huge ball of mostly hydrogen gas that is undergoing a nuclear fusion reaction in its core) Do stars have different colors? (yes) Are there any stars in our Solar System? (yes, the Sun) What color is the Sun? (yellow)
8. What is the Milky Way? (our galaxy) Are we part of the Milky Way? (yes)
9. Does the Moon give off light of its own? (no) What causes the phases of the Moon? (the way the Sun lights it up and the way the Moon revolves around Earth)
10. Why do the stars appear to move across the sky from east to west? (because Earth is rotating or spinning) Are they really moving? (no) What causes day and night? (the rotation of the Earth)
11. Why is the North Star (Polaris) so famous? (because it is directly above the North Pole of Earth and thus helps us find the direction north. It is not the brightest star.)
12. What is a magnetic field? (see project idea below) Does the earth have a magnetic field? (yes) Name some other things that have magnetic fields. (magnets, other planets, the Sun)
13. What is a light year? (A light year is a way astronomers measure great distances in space. Its based on the speed of light: 186,000 miles per second. One light year is the distance that light can travel at that speed in one years time. It equals about 6 trillion miles. For example, the closest star to us besides the Sun is Alpha Centauri, which is 4.3 light years away or 25,278,000,000,000 miles away!)

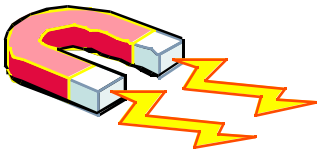


## PROJECT IDEAS



**1. Night Vision.** An important principle for viewing the night sky properly is giving your eyes a chance to get dark adapted. This process takes five to ten minutes. To illustrate this phenomenon, take your class to a room without windows (if one is available). Have everyone sit on the floor or in a chair so that no one will fall in the dark. Then turn out the lights. What can your students see? Right after turning the lights out, they shouldn't be able to see hardly anything. Have them sit in the dark for five to ten minutes and have them notice how their sight improves after a couple of minutes. Can they begin to see other objects in the room? At the end of the exercise, have them make a special note about how their eyes feel when you turn the lights back on. The light should seem very bright and make them squint. Now their eyes must adjust to the light!

**2. Magnetism.** To help your students visualize what a magnetic field is, here is a simple demonstration you can do for them:



Place a bar magnet under a sheet of paper. Sprinkle iron filings on top of the paper. Notice how the filings arrange themselves along the magnet and at the poles. With two clean magnets, have the children feel the magnetic pull and push of the magnets as they switch the polarity of the magnets.

**3. Library Work.** Another idea to prepare your students for their visit with the *Northern Stars Planetarium* and to sharpen their library skills is:

Assign individuals or groups to look up names of different constellations. Have them try to find out where the constellations got their names and what stories are told about them. We have enclosed a bibliography to help with this activity. Some names you might assign are Orion the Hunter, Canis Major and Canis Minor, the Big and Little Dogs, Gemini the Twins, Taurus the Bull, Cassiopeia the Queen, Hercules the Hero—the list goes on and on! Also, Indian sky legends and mythical lore are interesting topics for reading class.

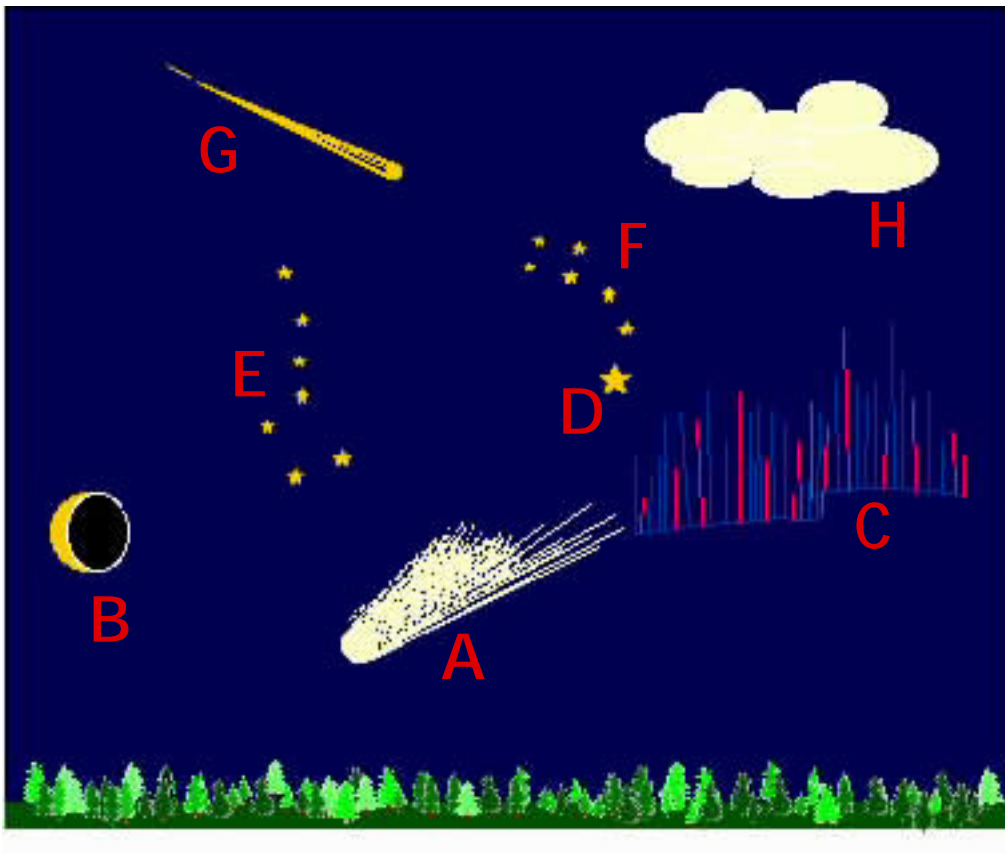
**4. Writing and Art.** After your students visit the planetarium and see *The Wonderful Sky* planetarium show, have them write us a letter describing what they learned or have them draw us a picture of their favorite part of the show or their favorite constellation. We love getting mail!

## MATCH THE WORD TO THE LETTER OF THE OBJECT IN THE SKY:

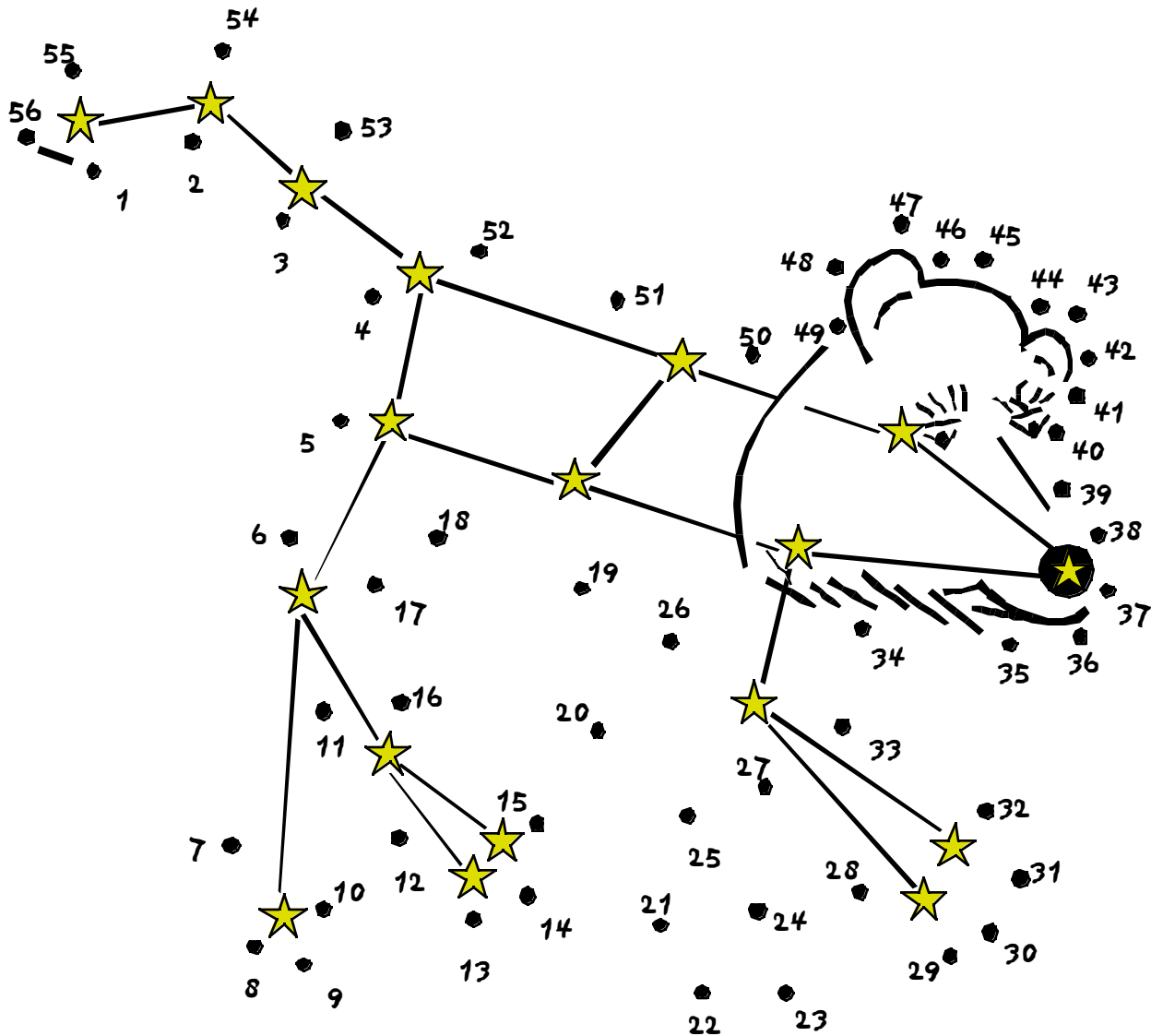
Meteor \_\_\_\_\_ Cloud \_\_\_\_\_ Northern Lights \_\_\_\_\_ Comet \_\_\_\_\_

Big Dipper \_\_\_\_\_ North Star \_\_\_\_\_ Crescent Moon \_\_\_\_\_

Little Dipper \_\_\_\_\_

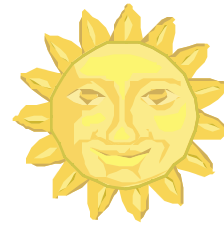


# Dot-to-dot Ursa Major the Bear



Can you find the "Big Dipper" hidden in Ursa Major, the Bear?

## THE WONDERFUL SKY WORD SEARCH PUZZLE:



R F V M E T E O R I T E M N E  
P A U A P O L A R I S P L O Z  
N L X R T E B K S K Y Q U R D  
A L A E G M C O U Z E T I T J  
D I J N I M O O N X C I P H Y  
A N U W E R N S S A J O R E A  
R G I X G T S N P M H A O R W  
K S R G J O T E O H R A M N Y  
N T C N H S E W T O E P I C K  
E A T O E T L C R R I R N I L  
S R E S M F L U G I H I E G I  
S D A K O E A W J Z G U N H M  
N H L I G H T H I T O Z C T M  
P O B I G D I P P E R V E S R  
I S U B X H O R I Z O N P I E  
H G E T W I N K L E E L K F D

Find the following words:

Light Twinkle Atmosphere Constellation Sunspot  
Mare Darkness Milky Way Prominence Meteorite  
Falling Star Polaris Northern Lights Comet Big Dipper  
Aurora Phases Sky Night Horizon Moon Planet

**Maria or Seas:**

- Mare Australe.....The Southern Sea
- Mare Crisium.....The Sea of Crises
- Mare Fecunditatis.....The Sea of Fertility
- Mare Frigoris.....The Sea of Cold
- Mare Humorum.....The Sea of Humors
- Mare Imbrium.....The Sea of Showers
- Mare Marginis.....The Sea of Margins
- Mare Nectaris.....The Sea of Nectar
- Mare Nubium.....The Sea of Cloud
- Oceanus Procellarum.....The Ocean of Storms
- Mare Serenitatis.....The Sea of Serenity
- Sites
- Mare Tranquillitatis.....The Sea of Tranquility
- Mare Vaporum.....The Sea of Vapours

**Craters:**

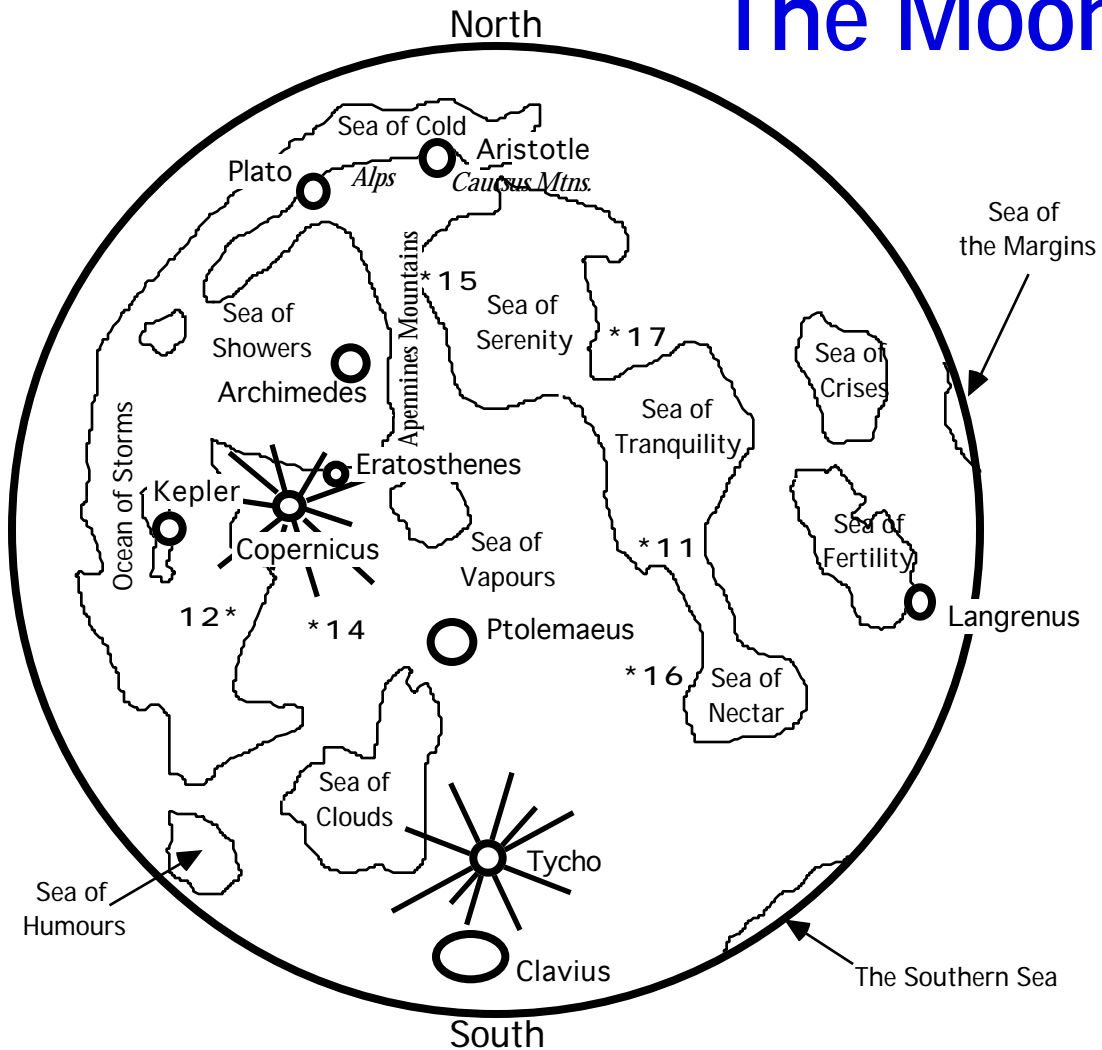
- Archimede
- Aristotle
- Clavius
- Copernicus
- Eratosthenes
- Kepler
- Langrenus
- Plato
- Ptolemaeus
- \* Apollo Landing

**Mountains Ranges:**

- Alps
- Apennines
- Caucasus



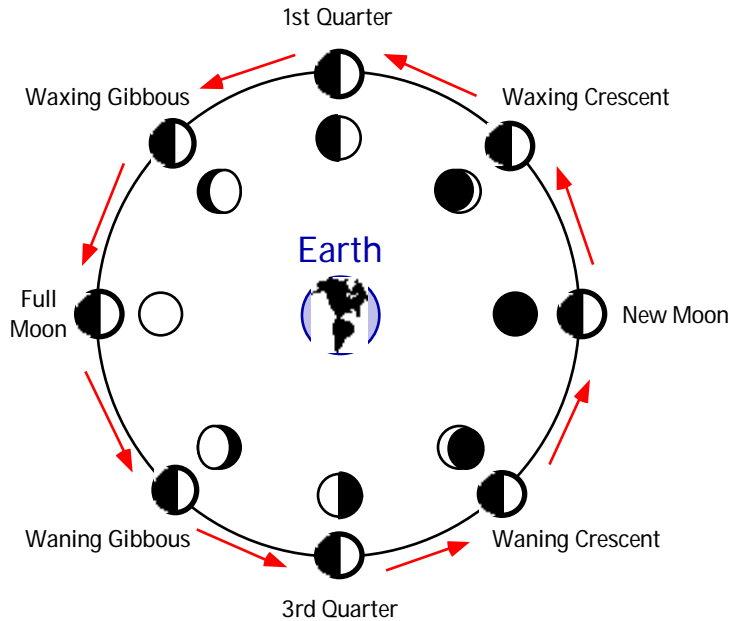
# The Moon



## The Phases of the Moon

The circles within the orbit show what the moon looks like from Earth at that phase.

Waxing means “getting bigger.” Waning means “getting smaller.”



1. What phase comes after a “1st Quarter Moon”? \_\_\_\_\_
2. What fruit most commonly resembles a Crescent Moon? \_\_\_\_\_
3. If the moon is “waxing” is it’s phase getting: BIGGER or SMALLER ?
4. What phase comes just after the Full Moon? \_\_\_\_\_
5. What does the moon look like at the “New Moon Phase”? \_\_\_\_\_
6. Is a “Waning Crescent” getting: BIGGER or SMALLER ?
7. Which phase of the moon reflects the most light towards earth? \_\_\_\_\_
8. What is the common unit of time that relates to one full set of phases? \_\_\_\_\_



## Useful Astronomy Web Sites:

- Astronomy Magazine:** <http://www.kalmbach.com/Astro/Astronomy.html>
- Astronomical Society of the Pacific:** <http://maxwell.sfsu.edu/asp/asp.html>
- Comet Hale-Bopp:** <http://newproducts.jpl.nasa.gov/comet/>
- Extra Solar Planets:** <http://www.obspm.fr/departement/darc/planets/encycl.html>
- Friends And Partners in Space (US & Russian Joint Efforts)**  
<http://solar.rtd.utk.edu/~jgreen/fpspace.html>
- International Dark Sky Society:** <http://www.darksky.org/~ida/index.html>
- International Space Station Alpha:** <http://issa-www.jsc.nasa.gov/>
- \*Jet Propulsion Lab (info on Space Probes):** <http://www.jpl.nasa.gov/>
- Lick Observatory:** <http://www.ucolick.org/>
- Life on Mars?** <http://cu-ames.arc.nasa.gov/marslife/>
- Mars Pathfinder Mission:** [http://mpfwww.jpl.nasa.gov/mpf/fact\\_sheet.html](http://mpfwww.jpl.nasa.gov/mpf/fact_sheet.html)
- The Nine Planets: (an excellent resource on solar system information)**  
<http://seds.lpl.arizona.edu/nineplanets/nineplanets/nineplanets.html>
- The NASA Homepage:** <http://www.nasa.gov/>
- Project Galileo:** <http://www.jpl.nasa.gov/galileo/>
- Sky and Telescope:** <http://www.skypub.com>
- Sky Watcher's Diary:** <http://www.pa.msu.edu/abrams/diary.html>
- Space Shuttle Archives:** <http://shuttle.nasa.gov/>
- Space Telescope Info:** <http://www.stsci.edu/top.html>
- Weather Net:** <http://cirrus.spri.umich.edu/wxnet/>

## Bibliography

### Younger Students:

Branley, Franklyn M., *The Planets in our Solar System*, New York: Harper and Row, Harper Junior Books, 1987.

----- *The Sky is Full of Stars*, New York: Harper and Row, Harper Junior Books, 1981.

Cole, Joanna, *The Magic School Bus, Lost in the Solar System*, New York: Scholastic, Inc., 1990.

Fradin, Dennis B., *Comets, Asteroids, and Meteors*, Chicago: Children's Press, New True Books, 1984.

Rey, H.A., *The Stars, A New Way to See Them*, Boston: Houghton Mifflin Co., 1976. (This is probably the best book for learning constellations for any age level.)

Ride, Sally & Okie, Susan, *To Space and Back*, New York: Lothrop, Lee & Shepard Books, 1986.

### Older Students:

Beatty & Chaikin, *The New Solar System, 2nd Ed.* Cambridge: Cambridge University Press, 1990. (High school to college age level)

Couper & Henbest, *New Worlds, In Search of the Planets*, Reading, MA: Addison-Wesley, 1986.

Gallant, Roy, *Our Universe, 2nd Ed.*, Washington D.C.: National Geographic Society, 1986.

Miller & Hartmann, *The Grand Tour: A Traveller's Guide to the Solar System*, New York: Workman Publishing, 1981.

Moeschl, Richard, *Exploring the Sky, 100 Projects for Beginning Astronomers*, Chicago: Chicago Review Press, 1989. (Contains lots of project ideas for both teachers and older students.)

Pogue, William, *How Do You Go To The Bathroom in Space?* New York: Tom Doherty Associates, 1985. (Younger Readers may also enjoy this Q & A book about space flight.)

### For Teachers:

Braus, Judy, Editor, *NatureScope: Astronomy Adventures*, Washington, D.C.: National Wildlife Federation, 1986.

*Universe in the Classroom*, Astronomical Society of the Pacific, Teacher's Newsletter, Dept. N. 390 Ashton Ave., San Francisco, CA 94112 (free to all teachers, request on school letterhead.)

# Planetarium Program Evaluation

After the Northern Stars Planetarium has visited your class, please take a moment to fill out this evaluation. Your suggestions are very valuable to us!

*Mail the completed evaluation to:*.....Northern Stars Planetarium  
15 Western Ave.

Fairfield, Maine 04937

*Or Email To:*.....info@northern-stars.com

1. Show Name: \_\_\_\_\_

2. Group grade/age level: \_\_\_\_\_

3. Was the material presented at an appropriate level for your class? \_\_\_\_\_

4. Was the amount of material discussed:      Enough      Overwhelming      Not Enough

5. Should any parts of the presentation be developed further? \_\_\_\_\_. If so, which parts?

6. Was there sufficient time for questions and answers?      Yes      No

7. Were you studying astronomy or another related subject at the time of the planetarium's visit?

Yes

No

If so, was the planetarium visit helpful? \_\_\_\_\_

8. Was the Teacher's Guide helpful in preparing your class for the planetarium visit?      Yes      No

Which parts were most helpful? \_\_\_\_\_

Which parts were least helpful? \_\_\_\_\_

9. Did the presenter present the material in a clear and understandable fashion? \_\_\_\_\_

10. How would you rate the overall program given to your class in the planetarium? \_\_\_\_\_

11. (Optional) Your name & school: \_\_\_\_\_

***Thank you for your time!      Your Comments Make a Difference!***