



Teacher's Guide for:

Prairie Skies

OBJECTIVES:

- To introduce students to the current night sky.
- To learn how to locate and recognize the constellations of the season.
- To learn how to locate the North Star.
- To hear myths and legends behind the figures created by ancient cultures.

This show conforms to the following Illinois state science standards: 12.F.2b, 12.F.2c, 12.F.3b, 12.F.3c. Next Generation Science Standards: 1.ESS1.1

BRIEF SHOW DESCRIPTION:

"Prairie Skies" investigates current sights in the night sky over Central Illinois. In the course of the 45 minute live presentation, students will learn the major constellations of the season as well as any planets currently visible to the unaided eye. Other telescopic phenomena, such as nebulae, external galaxies, and star clusters, are also examined. A playback segment tells of the myths and legends associated with the seasonal star patterns. "Prairie Skies" can possibly be altered to conform to specific topics covered in your classroom and is intended for all ages.

PRE-VISIT ACTIVITIES/TOPICS FOR DISCUSSION:

1. Check in the library for books on star maps and constellations. What constellations should we be able to see this month? How many can you list? Why can't we see them all? [Some are always below the horizon and some are up in the sky during the day.]
2. What is special about the North Star? [hint: It is NOT the brightest star, but this is a very common answer.]
3. How can we use the Big Dipper to locate the North Star? Try to find the North Star at night.
4. What, if anything, is "special" about the constellations of the zodiac?

POST-VISIT ACTIVITIES/TOPICS FOR DISCUSSION:

1. Help students recognize the constellations without the interconnecting lines by punching out holes in black construction paper for each bright star in the pattern. An overhead transparency projector works well here.
2. Using the method introduced in project #1, encourage students to construct their own constellations. From there, each may write their own legends and myths corresponding to the character or thing they have devised.
3. Let the students determine their latitude by measuring the altitude of Polaris, the North Star, from the northern horizon. This can be accomplished in two methods: When you make a fist with your hand and extend your arm ahead of you as far as possible, you can estimate angular distances in the sky. By sighting over and below your fist the apparent angle subtended from your little finger to your thumb is about ten degrees. Polaris should be roughly 4 fists, or 40 degrees, above the northern horizon. To attain greater accuracy

you will need to construct a Quadrant, an ancient device for measuring angles. You will need a straw, protractor, a short segment of string (8"), and a weight. When you site along the protractor, through the straw, the string measures the altitude.

- The stars above might seem two-dimensional to a backyard observer but we know that some stars are more distant than others. Illustrate this by creating a 3-D constellation. Allow students to research the distances to the stars that form the Big Dipper. Use a scale of 1 inch = 1 light year.

#	<u>Name</u>	<u>sounds like</u>	<u>Distance</u> <u>(light years)</u>
1	Dubhe	(DUBB-be)	105
2	Merak	(ME-rack)	80
3	Phecda	(FECK-dah)	90
4	Megrez	(ME-grez)	65
5	Alioth	(ALLEY-oth)	70
6	Mizar	(MY-zar)	88
7	Alcor	(AL-kor)	89
8	Alkaid	(al-KADE)	210

- To illustrate the Milky Way Galaxy in simplified terms, staple two paper plates together so that the bottoms of the plates are not touching. This disk represents the disk of our home galaxy. Put a yellow dot roughly 2/3 of the way from the center to the edge and label it "Sun." Discuss how we see the band of faint starlight in our sky that we call the Milky Way given our Sun's position in the galaxy. Explain how all the stars we can see in the night sky are members of this galaxy and that there are countless other galaxies. The central nucleus may be labeled as well as spiral arms drawn in.
- Star distances are measured in light years or the distance light travel in one year as a speed of 300,000 kilometers per second. Therefore when we observe a star at a distance of four light years, we are seeing how the star actually appeared four years ago when the light from the star was emitted. If the star exploded, we would not be informed of the explosion for four years.
- Discuss the prospects of interstellar travel given such distances. How long would it take to reach the nearest star system (Alpha Centauri, 4.3 light years distant) in a automobile at 65 miles per hour? In a Apollo spacecraft? On a Voyager spacecraft? Given these distances, discuss prospects of so-called "U.F.O.'s" being piloted by beings from other planets orbiting other stars.
- The Earth is continually beaming messages into space in the form of television broadcasts. Discuss how a possible civilization on a planet 25 light years away might perceive Earth after tuning in on 25 year old T.V. shows. What would they be watching? What would an alien culture infer about us after watching, say, "The Brady Bunch?"

VOCABULARY LIST:

Asterism	Galaxy	Milky Way
Circumpolar	Globular Cluster	Nebula
Comet	Horizon	Planet

Constellation	Latitude	Star
Degree	Light Year	Zenith
Ecliptic	Meteor	Zodiac

INTERNET RESOURCES:

- Sky & Telescope magazine (including an interactive star chart):
<http://skyandtelescope.com/>
- Stars & constellations:
<http://www.astro.wisc.edu/~dolan/constellations/constellations.html>
- Staerkel Planetarium charts (which can be duplicated):
<https://www.parkland.edu/Audience/Community-Business/Parkland-Presents/Planetarium/Educational-Resources/Star-Charts>
- Jim Kaler's web page: <http://stars.astro.illinois.edu/sow/sowlist.html>
- CU Astronomical Society (free monthly open houses scheduled near the First Quarter Moon): <http://www.cuas.org>
- UI Astronomical Society (open houses on the first Friday of the month):
<http://uias.astro.illinois.edu/index.html>.