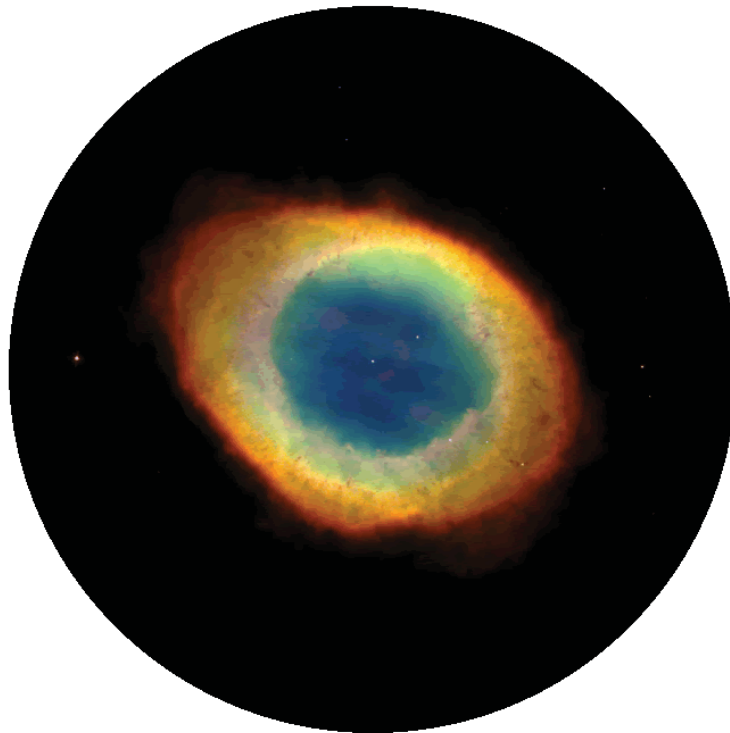


About

**i**NTERACT!

**PASS** Classic





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The original edition printing of the Planetarium Activities for Student Success series was made possible by a grant from Learning Technologies, Inc., manufacturers of the STARLAB Portable Planetarium.

Current electronic editions available on DVDs through Sky-Skan at <http://www.skyskan.com>



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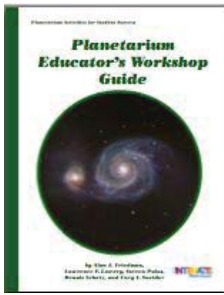
<http://www.lawrencehallofscience.org>

Planetarium Activities for Student Success

For latest information, valuable links, resources relating to the Interact! PASS Classic series, and how to obtain additional copies, visit:

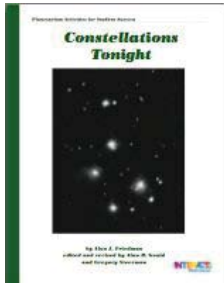
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**Disk 1**



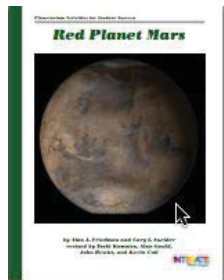
**Planetarium Educator's Workshop Guide**

*Workshop leaders*



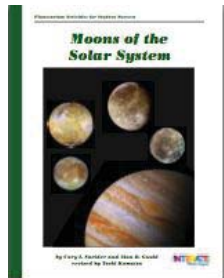
**Constellations Tonight**

*Ages 9–adult*



**Red Planet Mars**

*Ages 6–adult*



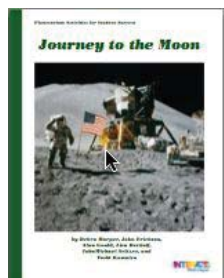
**Moons of the Solar System**

*Ages 9–adult*



**Colors From Space**

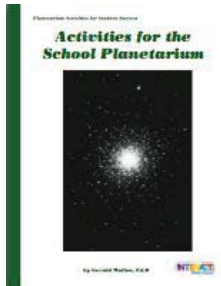
*Ages 6–adult*



**Journey to the Moon**

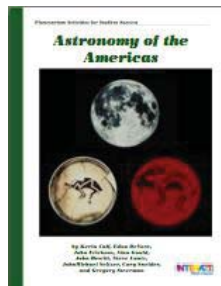
*Ages 4–6*

**Disk 2**



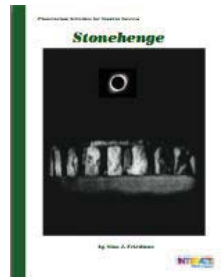
**Activities for the Planetarium**

*Ages 4–adult*



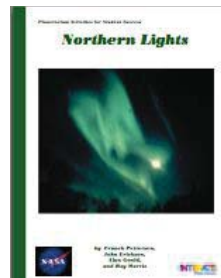
**Astronomy of the Americas**

*Ages 9–adult*



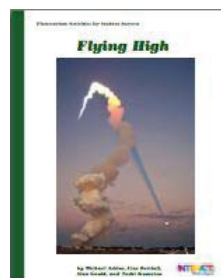
**Stonehenge**

*Ages 6–adult*



**Northern Lights**

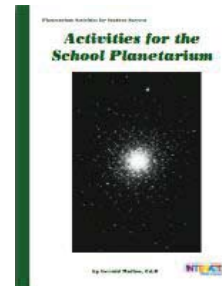
*Ages 8–adult*



**Flying High**

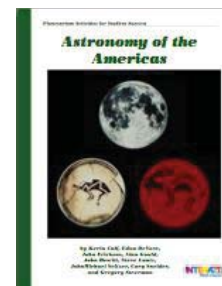
*Ages 4–6*

**Disk 3**



**How Big Is the Universe?**

*Ages 9–adult*



**Our Very Own Star**

*Ages 8–adult*



**Who "Discovered" America?**

*Ages 9–adult*



**Strange Planets**

*Ages 9–adult*

## DESCRIPTIONS FOR EACH VOLUME

### Planetary Educator's Workshop Guide

Participatory planetarium programs involve students actively in the planetarium environment. The most effective programs are both entertaining and educational. This guide introduces the theory and practice of developing effective planetarium programs through a series of thought-provoking activities and discussions. This volume contains the full listing of participants in the Participatory Oriented Planetariums (POP) and Participatory Oriented Planetariums for Schools (POPS) workshops, to whom we are truly grateful for contributing to the evolution of the concept of audience participation in planetariums.

### Planetary Activities for Schools

This volume provides a wealth of effective planetarium activities for elementary and middle school students, as well as ideas for developing new activities for students of any age.

### Astronomy of the Americas

There are hundreds of Native American cultures, each with distinctive views of the heavens. In this program students visit the Hupa people of Northern California, observing moon cycles and changes in the sunrise and sunset positions—observations that help Hupa stay in tune with the harmonies of nature. Other locales to visit include Medicine Wheel in Northern Wyoming, Chaco Canyon in New Mexico, Mexico, Central America, and Peru. Classroom activities include the Mayan and Aztec number systems, observing changes in real sunset positions, and learning how Venus can appear as either the “Morning Star” or “Evening Star.”

### Constellations Tonight

In this participatory version of a classic night sky planetarium program, students receive star maps and have an opportunity to use them to find constellations in the planetarium sky. Classroom activities include creating constellations and using star maps.

### Colors from Space

What can we learn about the stars and planets from their colors? During this program, students deepen their understanding of how we see color through a series of activities in which they “travel” to an imaginary planet circling a red sun, and experiment with color filters and diffraction gratings. Related classroom activities include making secret messages that can only be decoded with color filters, and then using the same filters to view nebulae and planets.

### Moons of the Solar System

This program begins with observations of the Earth's Moon and a modeling activity that shows why the Moon goes through phases and eclipses. Then the students look at Jupiter's four major moons on a series of nights and figure out how long it takes each one to circle Jupiter. Finally, the students journey through the Solar System to see many moons through the “eyes” of modern spacecraft. Classroom activities involve students in performing experiments in crater formation, using moon maps, and designing lunar settlements.

**Series Editors: Cary Sneider,  
Alan Friedman, and Alan Gould**

**If you have access to a planetarium for teaching about astronomy, space science, and other subjects, this series of books is for you. Designed for both experienced planetarium professionals and teachers who will be using a planetarium for the first time, these volumes provide a wealth of fieldtested strategies and practical suggestions for presenting entertaining and educationally effective programs for students.**

**The first four books provide a general orientation to astronomy and space science education with applications for both the planetarium and classroom settings. Each of the remaining volumes presents a complete planetarium program and related classroom activities. We hope you will find the materials useful in your work with students and teachers, as well as springboards for your imagination and creativity.**

### How Big Is the Universe?

Based partly on ideas from the short film Powers of Ten, this program surveys distances and sizes of things in the universe. Starting with ordinary things on Earth that students are familiar with, they move to progressively more distant astronomical objects: the Moon, the Sun, the Solar System, nearby stars, the Milky Way galaxy, and clusters of galaxies. Students use various methods to determine distance: parallax, “radar,” and comparing brightness of objects. Classroom activities include students writing their complete galactic address, making a parallax distance finder, and activities about the expanding universe.

### Northern Lights

Aurora borealis and aurora australis (northern and southern lights) are beautiful displays of moving luminous colored patterns in the night sky. Students identify what areas of Earth are best suited for aurora viewing. They model the different seasonal patterns of the Sun's apparent daily motion in various latitudes, including places where there is the phenomenon of “midnight Sun.” They observe and sketch aurorae, learn about the causes of aurorae, and find out about NASA missions that are studying aurorae. Classroom activities include selecting ideal locales on Earth for aurora watching, determining the altitudes of simulated aurora, predicting aurora on other planets, spectrum studies, and aurora mythology.

### Our Very Own Star

Beautiful views of the Sun are featured in this program, from optical effects of sunlight in Earth's atmosphere, to views of the Sun from space. Students make observations that show how the Sun can be used as a time keeper and how sunspots can show us that the Sun is giant spinning ball of gas. They use models of the magnetic fields of Earth and of the Sun to see why sunspots come in clusters and how the Earth's magnetism affects space around Earth. Classroom activities include using a gnomon and shadow of the Sun to find East, safely observing the real Sun, tracking sunspots, tracing magnetic fields, and watching solar storms.

## Red Planet Mars

Students discover Mars three different ways during this planetarium program. They find the red planet by observing it over a period of several nights as it moves against the background stars. Then they view it through a telescope and try to map its surface. Finally they see Mars via space probes. Classroom activities involve students in modeling the solar system, and creating creatures that could survive under different planetary conditions.

## Stonehenge

In this program, students learn what Stonehenge is and how it could have been used by its builders as a gigantic astronomical calendar. They also learn how astronomer Gerald Hawkins discovered one of Stonehenge's probable functions, by actively formulating and testing their own hypotheses in the planetarium. Along the way, they learn a lot about apparent solar motion, and the creation of the research field of "archaeoastronomy." Classroom activities include constructing a special Solar Motion Demonstrator to represent the entire yearly cycle of solar motion.

## Strange Planets

Consider age old questions in a new light: Are we alone? Do you think there might be other life out there? Demonstrations illustrate planet finding techniques including the Spectroscopic Method (detecting how much a star wobbles as it is tugged on by a planet's gravity) and the Transit Method (detecting drop in brightness when planet goes in front of a star). Learn about two very easy-to-find stars known to have planets that may well be quite strange: Pollux (binary star in Gemini) and Alrai (orange star in Cepheus). Students learn about Kepler's Laws and the idea of habitable zones of stars, then observe a 2-planet orrery creating a light curve graphed in realtime with data from a light sensor. They see how the size of a planet and how close it is to its star can be found by examining the light curves.

## Who "Discovered" America?

Students ponder the meaning of the word discover in this program. Can one "discover" a land where people are already living? Students learn the reasons and methods by which Columbus navigated to the "New World," and some of the impacts of his voyages on Native Americans. They learn about other explorers who "discovered" America long before Columbus's time and that Columbus was not alone in believing that the Earth is round. Classroom activities include determining the shape and size of the Earth, using quadrants to determine latitude, and modeling lunar eclipses.

## A Manual for Using Portable Planetariums

Primarily a "how-to" manual for setting up and using a portable planetarium, this guide has many suggestions useful for teaching school programs in any planetarium.

## Grade Level Chart

<b>Grades</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13+</b>
<b><i>Flying High</i></b>	█									
<b><i>Journey to the Moon</i></b>	█									
<b><i>Activities for the Planetarium</i></b>	█									
<b><i>Red Planet Mars</i></b>			█							
<b><i>Colors From Space</i></b>			█							
<b><i>Stonehenge</i></b>			█							
<b><i>Our Very Own Star</i></b>					█					
<b><i>Northern Lights</i></b>					█					
<b><i>Constellations Tonight</i></b>						█				
<b><i>Moons of the Solar System</i></b>						█				
<b><i>Astronomy of the Americas</i></b>						█				
<b><i>Who "Discovered" America?</i></b>						█				
<b><i>How Big Is the Universe?</i></b>						█				
<b><i>Strange Planets</i></b>						█				
<b><i>Planetarium Educator's Workshop Guide</i></b>	<i>(for Planetarium leaders)</i>									

# INTERACT!

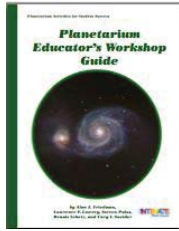
## PASS Classic

**Time-tested Planetarium Activities for Student Success!**  
**Available to purchase for ALL digital and classic planetariums**  
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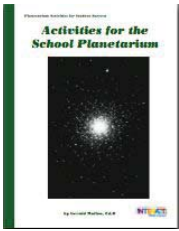
### DVD Disc 1

### DVD Disc 2

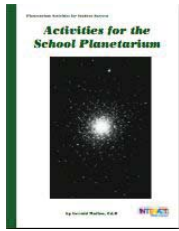
### DVD Disc 3



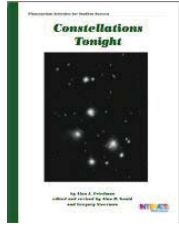
**Planetarium Educator's Workshop Guide**  
 Workshop leaders



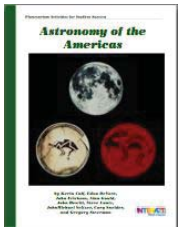
**Activities for the School Planetarium**  
 Ages 4–adult



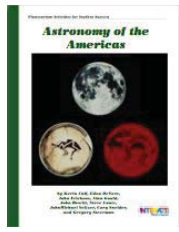
**How Big Is the Universe?**  
 Ages 9–adult



**Constellations Tonight**  
 Ages 9–adult



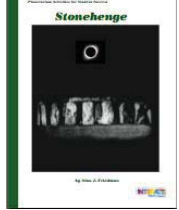
**Astronomy of the Americas**  
 Ages 9–adult



**Our Very Own Star**  
 Ages 8–adult



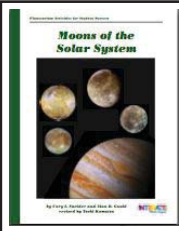
**Red Planet Mars**  
 Ages 6–adult



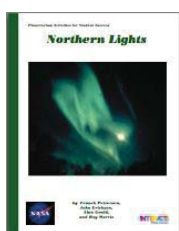
**Stonehenge**  
 Ages 6–adult



**Who "Discovered" America?**  
 Ages 9–adult



**Moons of the Solar System**  
 Ages 9–adult



**Northern Lights**  
 Ages 8–adult



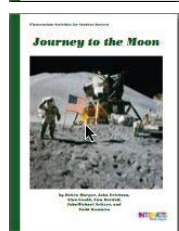
**Strange Planets**  
 Ages 9–adult



**Colors From Space**  
 Ages 6–adult



**Flying High**  
 Ages 4–6



**Journey to the Moon**  
 Ages 4–6

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