



DISCOVERING *Alabama*

Teacher's Guide

Night Hike

Suggested Curriculum Areas

Science
Art
Environmental Studies

Suggested Grade Levels

4–12

Key Concepts

Creation
Universe
Environment

Key Skills

Sensory Awareness
Scientific Inquiry
Philosophical Analysis

Synopsis

The Nature of Life is Nature. —Liberty Hyde Bailey, ca. 1900
proponent of “Nature Study”

The roots of today's environmental education can be traced to efforts of early educators, who believed in the importance of “nature study.” From such origins to the present, nighttime hikes and outings have been a time-honored strategy for environmental educators. Night outings are a wonderful way of combining sensory and intellectual processes in exploring such basic environmental topics as light, energy, seasons, geography, and the oldest of all sciences, astronomy.

Ancient queries about the heavens eventually led to the realization that changing shadows cast by the sun could reveal the passing of time, that the changing positions of the moon and Earth could affect sea levels, and that the rising of certain stars could signal the advent of seasons. Thus people could predict the future, prepare for planting and harvesting, and schedule the essential business of organized societies. As civilization advanced, out of astronomy came the sciences of geometry, arithmetic, methods of navigation by land and sea, and today, methods of navigation beyond the Earth to the reaches of our solar system.

This video takes viewers on a night hike in the Alabama backwoods, *without* the aid of flashlight, lantern, or other such luminary assistance. Along the way, tips are provided to help hikers acclimate to available natural light and thereby enjoy the special challenges and experiences afforded by a night outing. Chief among these experiences is the opportunity to gaze upon the Alabama night sky, unobscured by the glare of city lights. Guest astronomers and other experts provide added commentary as the video culminates with a firsthand examination of the ultimate context for all environmental studies, the grand scope of the stellar universe.



THE UNIVERSITY OF
ALABAMA



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Before Viewing

1. Take the class outside to a suitable location where the ground is level. Push a short, straight stick, about ten inches long, into the ground in such a way that it casts no shadow. In other words, the tip of the stick must be pointing at the sun. Wait until the stick makes a shadow about six inches long. (This shadow will form an approximate east–west line, with west at the stick and east at the shadow tip.) Divide the class into small groups and allow each group 10–15 minutes to a) determine which directions they think the shadow line represents, and b) develop an explanation for how/why this would be the case. Have each group report their explanation/reasoning to the class.
2. If you have access to a room that can be completely darkened, surprise the class by turning the room lights out and placing students in total darkness for a brief moment. Then, turn the lights back on and discuss the mystery of light (What is it? Why does it exist? How does it occur?) and the importance of light in our lives. Remind the class that for thousands of years (in fact until very recently in the span of history), there were no such conveniences as electric lighting. Discuss whether the sun, moon, and stars might have been of more immediate relevance to people during these earlier times, particularly for night time travel.

While Viewing

Ask students to watch for tips presented in the video about ways to use nature for navigating at night.

Video Mystery Question: In his *Adventures of Huckleberry Finn*, Mark Twain includes the following passage: “We had the sky up there all speckled with stars, and we used to lay on our backs and look up at them and discuss whether they was made, or only just happened.” Many of us can instantly identify with the experience described in this passage. Indeed, for centuries, people have pursued the question of whether the universe “was made, or only just happened.” What answer is given to this question by the scientists in the video? (Answer: The scientists in the video give no answer. Rather, science still considers this question to be among the unsolved mysteries of creation. See **Philosophical Reflections** for related discussion about recent efforts to bridge historic differences between science and religion in this regard.)

After Viewing

1. Place students in small groups again. Have each group list information learned from the video about ways to use nature for nighttime travel. Inquire whether any of your students have ever taken a night hike such as that presented in the video. If so, would these students like to share additional helpful tips?
2. Use the discussion provided in **Philosophical Reflections** to develop your own ideas for stimulating student discussion about the video mystery question. For example, have each small group of students spend 15–20 minutes discussing ideas and information presented in the video and include discussion of such questions as, “Why is there something rather than nothing?” and “Why does the human mind, through imagination and pure thought, have the unique capacity to question and decipher the workings of the world?”

Extensions

1. Obtain a set of star maps for our region. Have students examine the changing position of stars in relation to the movement of the Earth. Binoculars are useful for general nighttime sky viewing, see **Additional References and Resources** and back page for further tips.
2. Invite an astronomer to speak to your class so that students can inquire about theories of the universe.

Philosophical Reflections

In the beginning, “darkness was upon the face of the deep” (Genesis, 1:2). These Biblical words are fundamental to many religious beliefs. They are the premise upon which much of our society embraces the miraculous genesis of Creation: “And God said, Let there be light: and there was light” (1:3). Indeed, the light that shown across the firmament remains central to the mystery of creation, the essential mystery that has so inspired great minds throughout the ages.

The most beautiful thing we can experience is the mysterious. It is the source of all true art and science. —Albert Einstein

Einstein believed that light, together with time, gravity, and the configuration of space, are key manifestations of an intelligent essence, of a universe that is orderly and purposeful in its design. However, not all scientists agree with Einstein’s view. Many share a view similar to that expressed by physicist Steven Weinberg, who mused, “The more the universe seems comprehensible, the

more it also seems pointless.” Responding to such sentiments among colleagues, Einstein once countered with his now-famous assertion that God “does not play dice” with the universe.

Today, this difference in perspective continues to spark debate between scientific and religious circles, often stirring passions reminiscent of the controversy surrounding Charles Darwin and traceable back to the time of Galileo. For example, each new revelation about subatomic structure, from protons, to photons, to quarks, and so on, brings another round of dispute over whether these findings suggest purposeful design.

In recent years, the tensions between science and religion have mollified, thanks to a growing number of scientists and theologians who agree that there are mysteries beyond the reach of present scientific technology. Among these mysteries are, for example, the profound yet fundamental questions, “Why is there something rather than nothing?”; “How did the universe come to be?”; and “Why does the human mind, through inspiration and pure thought, have the unique capacity to question and decipher how the world works?” The apparent consonance between the mind of man and the workings of the universe suggests, to some, that science and religion deal with the same ultimate quests. Here, too, Einstein provides pertinent directive: *Science without religion is lame, religion without science is blind.*

Were he alive today, Einstein would surely express no surprise that new scientific discoveries are heightening our sense of wonder at the marvels of the universe. For example, images from the Hubble telescope often leave scientists and theologians alike in complete awe. As science writer Sharon Begley notes, these discoveries bring a new spiritual “sense of connection” between the yearnings of the human mind and the tapestry of creation.

So, what might we conclude from all of this in regard to environmental education? No doubt, there are educators who will deem the above discussion irrelevant to anything they are concerned with in daily life, much less in the classroom. Indeed, researchers have surmised that, in some school situations, there is a correlation between the absence of intellectual curiosity and a rising number of poorly motivated, uninspired students. Fortunately, most caring teachers strive to imbue students with a sense of wonder for the natural world, and they recognize the great potential of environmental education for achieving this aim. Also, they understand that such inspiration is developed one lesson at a time, in context with the grand environmental mysteries of the universe.

The most important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but be in awe when one contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery every day. —Albert Einstein

Nature in Art

Artists cannot escape universal shapes and forms in conveying their artistic interpretations, whether these portrayals be realistic, impressionistic, or abstract. This fact is akin to Plato's belief that reality includes fundamental forms that exist independent of the human mind. Thus, a key question of philosophy and science, "Why is there something rather than nothing?" is also pertinent in the world of art. This presents an opportunity to explore the interpretive works of famous artists and compare them with the interpretive analysis of famous philosophers and scientists. You might wish to begin this exploration with a bit of fun and a philosophical challenge: Ask your students to produce an artistic rendering of "nothing" rather than "something."

Community Connections

1. Give students the assignment to observe the night sky at home (or at some other place where the stars are clearly visible) and draw a diagram showing the location/arrangement of major features as seen on the chosen night. It is likely that many of your students will have difficulty finding a place where the stars are sufficiently visible. "Light pollution," the pervasive and far-reaching effects of urban-area lighting, is a problem of extreme proportions, noted by satellite studies as well as by the personal experiences of most astronomers of modern times. Discuss the efforts/difficulties experienced by your students in locating a suitable place for star gazing. Discuss the long-term implications for viewing the night sky if urban/suburban growth continues at present rates of expansion.

2. Determine if there is an astronomy club in your area. Contact them to arrange a night outing with the class. Or, you might prefer to organize your own astronomy club and undertake regular investigations of the night sky.

Complementary Aids and Activities

"Our Blue Planet" from *Alabama's Environmental Legacy: A Series of Classroom Activities*... available from Legacy, Partners in Environmental Education, P.O. Box 3813, Montgomery AL 36109; 800-240-5115.

"A Global View of the Wet Earth" from the *Water Sourcebook: A Series of Classroom Activities for Grades 9-12*, also available from Legacy, Partners in Environmental Education, see above for address.

From the *Project WILD Activity Guide*: "Philosophical Differences" and "To Zone or Not to Zone." Contact: Alabama Department of Con-

servation and Natural Resources, 64 N. Union St., Montgomery AL 36130; 334-242-3623.

From *Project Learning Tree: Environmental Education Pre K-8 Activity Guide*: "Sunlight and Shades of Green" and "Publicize It." Contact: Alabama Forestry Association, 555 Alabama St., Montgomery AL 36104.

Additional References and Resources

- *Native American Legends* (1987), compiled and edited by George E. Lankford, is a good resource for tales and stories about the Earth, the moon, and the stars.
- *A Field Guide to the Stars and Planets* by Donald H. Menzel and Jay Pasachoff (3rd ed., 1992).
- *Sky & Telescope Magazine*. Articles and pictures with a Abrams map and calendar each month; visit: <http://skyandtelescope.com>
- *Astronomy Magazine*. Like *Sky & Telescope*, without the Abrams maps, visit: www.astronomy.com
- *Abrams Planetarium Sky Calendar*. The sky calendar is in two parts, an up-to-date daily calendar and a monthly sky chart with the planets plotted on it. Not as complicated as other sky charts, it is just right for beginners. For more information and links: www.pa.msu.edu/abrams/SkyCalendar/Index.html

Interesting Websites

- **NASA:** www.nasa.gov. Note the "Cool NASA Websites" on the home page, such as LIFTOFF—<http://liftoff.msfc.nasa.gov>—for teenagers and adults; for younger students, NASAKIDS—<http://kids.msfc.nasa.gov>
- **Satellite Finder:** Many satellites are visible with the naked eye. To find out when a lot of big satellites are visible, check out this NASA site: <http://liftoff.msfc.nasa.gov/RealTime/Spas>
- **University of Alabama**, the Physics and Astronomy Dept. hosts a series of public viewing nights. For a schedule see: www.astr.ua.edu/PublicNights.html
- **State Parks:** www.dcnr.state.al.us/parks The Department of Conservation's State Parks Web page—great for locating a dark place in your area.
- **National Forests:** www.southernregion.fs.fed.us/alabama.

Alabama Astronomy Resources

Mobile Astronomical Club

<http://hometown.aol.com/rmollise>

Birmingham Astronomical Society

www.bas-astro.com

Von Braun Astronomical Society (Huntsville)

www.vbas.org

Parting Thoughts

The early advocates of nature study would probably react with mixed emotions upon visiting our world today. On one hand, the natural environment is an increasingly acceptable topic for schools. On the other hand, environmental education is often conducted incidentally rather than being central to the curriculum. Environmental education materials are typically available to schools as optional resources, used only if an interested teacher finds an occasional moment to include such a resource.

Also troubling, the primary motivations of those promoting environmental education today are sometimes derived more from political or organizational affiliation than from genuine interest and curiosity about the natural world. And, at times, well-meaning folks are simply, well, confused about environmental education. This is seen, for example, in cases when environmental education is equated only with environmental science. Such confusion is typified by those who believe that environmental education should focus on the legal and technical aspects of environmental regulation. Likewise, confusion is seen in cases when environmental education is equated solely with promoting environmental activism, as is typified by those who emphasize recruitment to activist organizations.

The good news is, experienced teachers have little difficulty seeing past the biases, vested interests, and political agendas that motivate many who hawk various brands of environmental education. Most teachers easily comprehend the larger aims of environmental education for inspiring young minds and furthering the pursuit of knowledge and understanding about our world. The bad news is, the vested interests and political agendas that have long dominated in Alabama are not likely to soon expand their narrow views of environmental education, nor to relinquish efforts to promote self-serving perspectives.

Oh yeah, I almost forgot. We at Discovering Alabama regularly hear from teachers who would like to see greater support for the interdisciplinary environmental programming provided by the Discovering Alabama series. Needless to say, we share their concern.



Happy outings,

In Legacy



DISCOVERING *Alabama*

Activity/Information Sheet

Night Hike

Suggestions for Conducting a Night Hike

There are a number of things to consider when planning a night hike. The first concern is to make sure that everyone has a safe experience. Find a dirt road closed to traffic in a national forest or on private property (discuss beforehand with the ranger or owner). Do a nighttime trial run to identify suitable teaching stops and to check for dangerous objects, treacherous terrain, etc.

Late fall is the best time for conducting a night hike with your students. The night sky is usually clearer, and there is less risk of encountering poisonous snakes. Arrange lots of chaperones for younger groups and dress everyone warm. Leave word of your hiking plans with someone at home or at school and be sure to have more than one vehicle available nearby in case of an emergency.

A night hike is often best with a small group; if possible, no more than 20 students. This allows you to speak softly enough to establish a quiet, listening mood while also helping you keep an ear out for any problems that might arise. An hour and a half is about all most students' attention can handle. Sternly enforce light discipline. Remember that the first 30 minutes will be

devoted to getting night vision and becoming used to the novelty of being outside at night without a light. While you are still getting your night vision, make a stop to search for interesting shapes and shadows. Explain that, while the eyes are adjusting, it is sometimes helpful to scan an object from side to side rather than try to focus intently on it. Next, make a stop devoted to listening to night sounds. You might wish to also include stops for considering pertinent music, e.g., Holst's *The Planets*, the "Jupiter" movement is especially good (visit www.aquarianage.org/lore/holst.html), relevant poetry, and literature. A key stop should be arranged where everyone can see the sky as you use your walking stick to point out various stars, constellations, and planets. Of course, to maximize learning, you should do pre-hike activities (perhaps using the Abrams star charts, see **Additional References and Resources**) and do follow-up activities including creative writing, art, or science investigations. Thus, you will discover that you and your class can draw upon the night hike experience all year long.

A Word About Telescopes

A telescope is not needed for basic astronomy activities. Once your eyes are adapted to the dark you can see most stars, constellations, planets, phases of the moon, and shooting stars. With ordinary binoculars you can see nebulae, double stars, the craters of the moon and star clusters. Small, inexpensive telescopes are generally unsatisfactory. In order to see any detail, you need a *large* telescope—difficult to set up and slow to use. If there is someone who has and can assist you with a large telescope, good, but you can have an outstanding stargazing experience without one!

A Word About Night Vision

Night vision is due to the presence of a chemical—visual purple—that is produced in the retina of your eye. It is destroyed by light and takes at least 30 minutes to naturally replenish to use-

ful levels. You will find it difficult to keep students from using their flashlights, as most of them have never experienced fully-developed night vision. Even the briefest white light will damage night vision. You, on the other hand, need to see, so a thick red plastic filter (or several layers of red cellophane) over your light will enable you read the star chart and point out the sights without damaging your own night vision.



SINCE PREHISTORIC TIMES, the human race has gazed upon the heavens and interpreted the stars. The myths handed down by ancient peoples have contributed to some of the names of the starry patterns associated with a total of 88 constellations, which can be grouped into eight separate families.

1. Ursa Major: Native American legends about the Great Bear—also called the Big Dipper—imply that it is looking for a place to hibernate.

2. Zodiacal: Twelve constellations, one for each month of the year: Leo, Virgo, Libra, Scorpius, Sagittarius, Capricornus, Aquarius, Pisces, Aries, Taurus, Gemini, and Cancer.

3 & 4. Perseus and Hercules: Groups of 9 and 19 constellations, respectively, associated with mythical Greek heroes.

5. Orion: Five constellations centered around the hunter and his two dogs, a bull, a hare, and a unicorn.

6. Heavenly Waters: Nine constellations with names reflecting the inhabitants of the sea and ships that sail upon her.

7 & 8. Bayer and La Caille: Two families, named after their delineators, comprising a total of 23 constellations.