

A Teacher's Guide to

***RUSTY ROCKET'S
LAST BLAST***

Presented by the
Cernan Earth and Space Center
Triton College
River Grove, Illinois

Welcome to the Cernan Earth and Space Center

Introduction

Please take a few minutes to read through this Teacher's Guide before you and your group visit the Cernan Earth and Space Center. It contains important tips and guidelines about your field trip, describes the program that you selected and includes some teacher resources to help you better integrate your Cernan Center visit with your own classroom activities.

The Cernan Earth and Space Center

The Cernan Earth and Space Center of Triton College is a unique and exciting place for persons of all ages. The Cernan Center houses a 100-seat dome theater, a Space Hall with exhibits on space exploration and astronomy and the Star Store gift shop.

The Cernan Earth and Space Center is named for astronaut Eugene A. Cernan, who flew aboard the Gemini 9, Apollo 10 and Apollo 17 space missions. In December of 1972, as the commander of Apollo 17, Captain Cernan became the last human to leave his footprints on the moon. Cernan was born and raised in suburban Bellwood, not far from where the Triton College campus and the Cernan Center now stand. The original Cernan Center building opened in 1974, and in 1984, it re-opened in a new and larger facility.

The Cernan Earth and Space Center's 44-foot diameter dome theater is equipped with a planetarium star projector, a special C-360 motion picture projector, a sophisticated laser projection system, a large format video projection system, a powerful stereo sound system and scores of slide and special effects projectors. Using this equipment, the Cernan Center presents a wide range of educational programs that discuss such diverse subjects as the current night sky, the planets of our solar system, the weather and climate of earth, the space shuttle and the age of dinosaurs. For pure entertainment, the Cernan Center also presents laser light shows that choreograph laser images and planetarium effects to rock music.

The Cernan Earth and Space Center's Space Hall contains a variety of exhibits related to astronomy, space science and earth science. Included are Captain Cernan's Apollo 10 spacesuit and coverall garment, Apollo 17 moon gloves, an Apollo lunar landing diorama, a moon phase exhibit, a weather radar station, a 1/15th scale space shuttle model, a life-size dinosaur footprint model, an Illinois fossil exhibit, a telescope exhibit, an exhibit on recent space discoveries and a variety of other Apollo artifacts. Outdoor exhibits include an Apollo practice capsule and a Nike Tomahawk missile.

The Cernan Earth and Space Center's Star Store gift shop offers an assortment of unique gifts, many related to the popular themes of astronomy, space exploration and the study of our own planet earth. Books, t-shirts, sweatshirts, binoculars, science discovery kits, coffee mugs, posters and unique toys are just a few of the many items for sale. Some items are even \$1.00 or less, so even younger patrons can buy a souvenir or two during their visit.

Important Field Trip Information

Listed below are a few tips to help make your trip to the Cernan Earth and Space Center run smoothly and stay on schedule:

1. BEFORE YOU ARRIVE. If for any reason you need to reschedule or cancel your reservation, please call the Cernan Center and let us know as soon as possible. Doing so allows us to better accommodate other groups that may prefer your original time slot and may prevent your group from being charged a cancellation fee.

2. ARRIVAL. Plan to arrive at the Cernan Center at least 15 minutes before your scheduled show. This will give you time to check in your group, use the restrooms if necessary and instruct your group to line up at the entrance to the dome theater. If you are planning to eat lunch or visit the Star Store before your show, you should arrive even earlier. Buses and vans should park along the curb directly in front of the Cernan Center and should remain there for the duration of your visit. Automobiles should park in the North Parking Lot just north of the Cernan Center building after dropping off their passengers.

3. CHECKING IN. When you arrive at the Cernan Center, the group leader should check in at the Star Store. Remember to bring the confirmation card that you received in the mail. Please make a note of the number of students and chaperons that you will be paying for. Remember that you must pay in bulk, so please collect the students' money beforehand or have a check made payable to Triton College. In special circumstances, you can make arrangements in advance to have us bill your school or institution after your visit.

4. ENTERING THE THEATER. Your group should be lined up at the dome theater entrance five minutes before your scheduled show time. Please remind your group that they are on a college campus and must remain quiet because of classes in session nearby.

5. SEATING IN THE THEATER. A Cernan Center staff member will let your group into the theater and instruct you on the best place to sit. Since more than one group is often scheduled at the same time, your group should sit together. No food, drink, candy or gum is allowed in the theater.

6. BEHAVIOR IN THE THEATER. Teachers and chaperons are responsible for the behavior of their group. Since the show operator is seated at the top of the room, he or she is often unable to hear or see minor incidents of disruptive behavior. Although the show operator will certainly stop the show for a disruption in the audience, we would prefer that the group leaders control the behavior of their own group.

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7. VISITING THE STAR STORE. If your group plans to visit the Star Store gift shop, please do not allow everyone into the store at once. If you have over 20 students, allow only 10 or 15 students in the store at a time. We also ask that only children with spending money be allowed into the store. This lessens the handling of the merchandise and prevents it from becoming soiled or damaged. We would also appreciate that one teacher or chaperon remain in the gift shop to help maintain order with their group.

8. HAVING LUNCH. With prior notification, the Cernan Center can usually arrange to have Triton College set aside tables on which your group can eat their own bag lunches. Groups can also pre-arrange with the Triton College cafeteria to purchase lunch packages. If your group has reserved this lunch area, we recommend that your group keep the lunches together in boxes or large bags rather than having the students carry them individually. As long as your lunches are in some sort of container, we will be able to provide an area for them to be stored while you are in the dome theater. A staff member will provide you with a campus map to direct your group to the Triton College cafeteria, which is a five-minute walk from the Cernan Center.

9. ANY QUESTIONS? We pride ourselves in offering friendly, personalized service, so if you have any questions pertaining to your trip to the Cernan Center, just give us a call at **(708) 456-0300, Ext. 3372** and we'll be happy to answer them. You can also contact one of our staff astronomers if you have a question related to astronomy, space science or earth science.

WE LOOK FORWARD TO SEEING YOUR GROUP AT THE CERNAN EARTH AND SPACE CENTER!

VISIT THE CERNAN CENTER ONLINE!

Visit the Cernan Center online at: **www.triton.edu/cernan**. To shop our Yahoo! Store online, please visit: **shop.store.yahoo.com/cescstarstore/index.html**. You can also e-mail one of our staff astronomers if you have a question related to astronomy, space science or earth science at: **cernan@triton.edu**.

For more information about the Cernan Center, its programs, field trips or events, please call (708) 456-0300, Ext. 3372. For public program information, please call our Program Line at (708) 583-3100.

Earth and Space Exhibits

The Cernan Earth and Space Center has a number of earth and space exhibits in its main lobby, as follows:

APOLLO / MARS LANDSCAPE DIORAMA

This large exhibit, covered by a plastic dome, is a two part exhibit. One half of the exhibit commemorates the successful Apollo missions to the moon, while the other half celebrates the present and future exploration of Mars. The Apollo side of the diorama contains models of the lunar module (the Apollo spacecraft that brought two astronauts to the lunar surface each mission) and the lunar rover, which astronauts used in the final three Apollo missions (15, 16 and 17) to extend the range of their lunar explorations. The Mars side of the diorama re-creates the rocky and sandy Martian landscape, complete with scale model of the Sojourner probe.

APOLLO 10 SPACE SUIT

This was the space suit worn by astronaut Gene Cernan on the Apollo 10 mission. This space suit was never worn on the moon, since the Apollo 10 mission was not designed to land astronauts on the surface. Instead, this mission served as the final “dress rehearsal” before the first lunar landing mission of Apollo 11 two months later.

OTHER APOLLO ARTIFACTS

This case contains a variety of Apollo artifacts, including the gloves worn by astronaut Harrison Schmitt (who explored the lunar surface with Gene Cernan on Apollo 17), a coverall garment worn by Gene Cernan en route to the moon and several pieces of Apollo spacecraft navigation equipment.

EARTH VIEW EXHIBIT

This computer generated video exhibit, which updates every five minutes, displays a world map that shows the current day and night hemispheres, along with the locations on earth that have the sun directly overhead and the moon directly overhead.

DOPPLER WEATHER RADAR

On days when there is rain or snow in the Midwest, the Doppler Weather Radar exhibit displays the intensity and movement of this precipitation.

“MOON SHADOWS” EXHIBIT

This interactive exhibit uses a model of the earth-moon system to assist viewers in understanding the phases of the moon. By looking through an eyepiece built into the exhibit, viewers can observe how the moon phase changes as they manipulate the position of the moon along its orbit.

TELESCOPE EXHIBIT

This exhibit shows cutaway models of the major types of telescopes and describes a few of the many celestial objects that can be seen with small telescopes.

DINOSAUR FOOTPRINT

This is a full-scale model of a footprint and lower leg bone of a Brachiosaurus that illustrates the size of these great prehistoric animals. This is not a real footprint, nor was this the footprint from a dinosaur found locally. No dinosaur bones have ever been found in northern Illinois due to the fact that glaciers from the last Ice Age “scoured away” any dinosaur fossils that may have once existed.

FOSSIL EXHIBIT

This exhibit displays a wide variety of Illinois fossils including our state fossil, the “Tully Monster.”

SPACE EXPLORATION EXHIBIT

This exhibit displays information about the Hubble Space Telescope and other unmanned spacecraft and some of the recent astronomical discoveries that they have made.

CURRENT EVENTS BULLETIN BOARD

This bulletin board contains a current sky map; the latest astronomical images from the Hubble Space Telescope; and news stories featuring recent scientific discoveries, often obtained the same day from Internet sources.

OUTDOOR EXHIBITS

The Nike Tomahawk missile was used to collect weather information in the earth’s upper atmosphere. The Apollo Practice Capsule never flew in space, but was used by the U.S. Navy to practice ocean recoveries.

The Cernan Earth and Space Center also offers an **Exhibit Hunt handout** that can be distributed to each student before or after their scheduled program(s). To complete the Exhibit Hunt, students must find answers to the questions among the artifacts and text panels throughout the Cernan Center’s lobby exhibit area. The activity takes approximately 20 to 30 minutes to complete.

If you’d like to arrange an Exhibit Hunt for your students, please let the Cernan Center know before your scheduled visit.

The Cernan Center’s exhibits are subject to change. Any changes to the exhibit area will be posted to the Cernan Earth and Space Center Online, which can be found at: <http://www.triton.edu/cernan>. Click on “Exhibits” to access this information.

Rusty Rocket's Last Blast

This is the Cernan Center program that you made a reservation to see. Below is some basic information about the show that should help you prepare your class for their upcoming visit.

Show title: *Rusty Rocket's Last Blast*
Grade Level: Preschool through 2nd grade
Length: 40 minutes

Summary of show:

This multi-media planetarium program features an imaginary character named Rusty Rocket, a friendly rocket whose job is to train astronauts preparing to go into space. Rusty is near retirement, and he is beginning to think of what he'll do once he's finished his last class. "Rusty's Boogie," a little song about the famous rocket instructor, is sung to the audience and to Rusty.

In class, Rusty's job is to transform "rocket rookies" into full-fledged "space cadets." He begins by describing a typical mission into space, from the long wait aboard the spacecraft to the excitement of the final countdown. Rusty explains that the loud noises that the rocket makes is necessary to overcome the pull of gravity, the invisible force that holds everything down on the earth. He explains that once the rocket is in orbit, the speed of the spacecraft balances the pull of the earth's gravity, and the spacecraft maintains its orbit.

If the rocket were to go faster, it could escape the pull of earth's gravity and travel out into space – perhaps to the moon. The distance to the moon (250,000 miles) is explained by the time it would take a rocket, jet plane or automobile to get there. The Apollo missions to explore the moon between 1969 and 1972 are then described, with the help of Rusty's uncle Lem (a play on words. LEM = lunar module). Lem describes what it was like to be on the moon.

If a rocket were to travel even farther into space, it could visit the earth's nearest planetary neighbor, Venus. The planet Venus – covered with a thick carbon dioxide atmosphere and 900 degrees on the surface – was explored by an unmanned Soviet spacecraft named Venera in the 1980's. Rusty then continues his voyage away from Venus and on to the next planet, Mercury. Slightly larger than the earth's moon, Mercury is another hot planet covered with craters.

At the center of the solar system is the sun, which Rusty describes next. Its immense size (a jet plane would take two months to fly from one side of the sun to the other) and heat (10,000 degrees at the surface) are described, along with the dangers of looking at the sun or getting sunburned at the beach.

Rusty Rocket continues his travels through the solar system by first returning to earth en route to the outer planets. Rusty brings the audience to Mars (with its reddish surface), Jupiter (with its colorful cloud bands, rings and moons), Saturn (with its beautiful rings), Uranus, Neptune and Pluto. Pluto is so far from the sun that it would take 15 years for a rocket to get there and 648 years for a jet plane to get there.

Finally, Rusty Rocket returns to earth and bids his space cadets a fond farewell. “Rusty’s Boogie” is sung again and concludes the program. A brief question-and-answer period follows the presentation.

Vocabulary:

The following space-related words are used in *Rusty Rocket’s Last Blast*:

air	astronaut	gravity	orbit	rocket
asteroid	atmosphere	microgravity	rings	radiation

Pre-visit Preparation:

Like all the dome theater shows presented at the Cernan Center, no preparations are needed for students to enjoy and learn from their visit. If, however, you would like to conduct some pre-visit class discussions, you can start by using information contained in the “Summary of Show” and/or the “Post-visit Activities” sections of this Teacher’s Guide.

Post-visit Activities:

After your visit to the Cernan Center, you may wish to discuss one or more of the following topics with your class, or perhaps have your students research the topics themselves and prepare a report or oral presentation.

- Ask students to imagine that they are sitting in a spacecraft that is about to launch into space. What would they be thinking of? What kinds of feelings would they be experiencing? After the discussion, have younger students draw a picture, while older students could write a pretend letter to a friend describing their last thoughts before liftoff.
- Ask your students to describe the many different kinds of night sky objects (e.g. stars, planets, moons, meteors, and comets). How are each of these objects different from one another? How are they similar?
- Using classroom volunteers, have one student pretend to be the sun, another to be the earth, and still another to play the moon. Set this “human model” into motion by asking the moon to revolve around the earth while the earth slowly revolves around the sun. After this exercise is over, you can tell your students that in the real universe, the sun would also slowly revolve around the center of our Milky Way galaxy.

- Have students prepare a list of the objects they would want to take along if they were going to take a trip to the moon or Mars. Describe some of the restrictions that space travelers have today such as weight and size limitations.
- Ask your students to explain how the Space Shuttle is different from other rockets that have been sent into space. How is it different from an airplane?
- Have your students write their own astronomy story (either individually as a group) or read a story to your class that is about astronomy or space travel.
- Have your students write a story pretending they are astronauts experiencing microgravity for the first time. What kinds of normal daily activities would be different or more difficult in microgravity?
- Have students research some of the unmanned space missions that were mentioned in the show. Make a solar system model to hang in the classroom, showing where each spacecraft visited and what happened to it.
- Several organizations have written excellent teaching units on building model rockets. Students love building rockets (even water rockets) and the process is multi-disciplinary. For information on purchasing rocket materials, contact **Estes-Cox Corporation, 1295 H Street, Penrose, CO 81240**. Their website is **www.estesrockets.com**.
- The Cernan Center presents a weekly children's show for the public on Sunday afternoons. For more information about this, please call the Cernan Center at **(708) 583-3100** or visit our website at **www.triton.edu/cernan**.

Teacher Resource Pages

Whether your class is studying astronomy, dinosaurs or earth science, the dome theater programs offered by the Cernan Earth and Space Center serve as an excellent supplement to your classroom instruction. However, if you would like to further research your subject area, or are looking for additional information on the topics presented in our shows, please refer to the following list:

ASTRONOMY AND SPACE SCIENCE

A wide variety of online resources can be found at the Cernan Center's Astronomy/Space Links page by visiting www.triton.edu/cernan and clicking on "Space Links."

NASA -- Educational materials including fact sheets, newsletters, slides, and videotapes.

1. NASA Educator Resource Center; Museum of Science and Industry; 57th Street & Lake Shore Drive; Chicago, IL 60637. Phone: (773) 684-9844, Ext. 2426. FAX: (773) 684-5580.

Website: www.msichicago.org. It has an extensive NASA video collection. Copies available free of charge if you provide blank tape. Many other resource materials available.

2. NASA Glenn Research Center; NASA Educator Resource Center; 21000 Brookpark Rd., MS 8-1; Cleveland, OH 44135. Phone: (216) 433-2017. FAX: (216) 433-3601.

Website: www.grc.nasa.gov/WWW/PAO/html/edteachr.htm. NASA Teacher Resource Centers are established to provide educators with NASA-related educational materials for use in the classroom. These materials can be references or duplicated at the Center; they include classroom activities, lesson plans, teacher guides, laser disks, slides, audio and video tapes. Most materials and services are also available at Chicago's Museum of Science and Industry.

3. "Report to Educators" Free quarterly periodical about NASA for educational use. Request subscription on school letterhead by writing:

NASA Report to Educators
Education Affairs Division
Code XE
NASA
Washington, D.C. 20546

ASTRONOMICAL SOCIETY OF THE PACIFIC – "The Universe in the Classroom." A quarterly newsletter on teaching astronomy. Request free subscription by completing the electronic subscription form at www.astrosociety.org/education/publications/tnl/tnl.html.

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PERIODICALS:

1. SKY AND TELESCOPE Magazine. Monthly periodical. For subscription information, please write or call:

Sky Publishing Corporation
49 Bay State Road
Cambridge, MA 02138
(800) 253-0245 Website: skyandtelescope.com

2. ASTRONOMY Magazine. Monthly periodical. For subscription information, please write or call:

Kalmbach Publishing Co.
21027 Crossroads Circle
P.O. Box 1612
Waukesha, WI 53187
(800) 533-6644 Website: www.astronomy.com

3. ABRAMS SKY CALENDAR. Monthly sky map and astronomy events calendar. For subscription information, please write:

Abrams Sky Calendar
Abrams Planetarium
Michigan State University
East Lansing, Michigan 48824
Website: www.pa.msu.edu/abrams/SkyCalendar/Index.html

4. ODYSSEY Magazine. Children's monthly astronomy periodical. For subscription information, please write:

Cobblestone Publishing Company
30 Grove Street, Suite C
Peterborough, NH 03458
(800) 821-0115 Website: www.odysseymagazine.com

Please help us keep our information current. If you discover an address, phone number, or Internet address in our Teacher's Resource Pages that has changed, please inform the Cernan Center at **(708) 456-0300, Ext. 3372**. Thank you very much.

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EARTH SCIENCE

A wide variety of online resources can be found at the Cernan Center's Earth Science Links page by visiting www.triton.edu/cernan and clicking on "Earth Links."

DINOSAURS:

The best local resource for educators is the Field Museum of Natural History in Chicago. Call (312) 922-9410 and ask for the Teacher Resource Department. Website: **www.fnmh.org**

GEOLOGY:

U.S. Geological Survey (USGS) Website: **www.usgs.gov**
Boulder, Colorado

WEATHER:

National Climatic Data Center Website: **lwf.ncdc.noaa.gov/oa/ncdc.html**
NOAA Environmental Data Services
Federal Building
Asheville, North Carolina 28801

National Weather Service Website: **www.nws.noaa.gov**
Public Affairs Office
Silver Springs, Maryland
(301) 899-3296

Illinois Emergency Services and Disaster Agency
100 E. Adams
Springfield, Illinois 62706
(217) 782-2700

MISCELLANEOUS:

National Geographic Society Website: **www.nationalgeographic.com**
Educational Services
Department 38
Washington, D.C. 20036
(800) 368-2728

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