

Digital STARLAB



Set-up, Operation and Maintenance

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**Welcome aboard
and keep the stars
in your eyes!**

Getting Started

Introduction

Thank you for your purchase of the Digital STARLAB projection system. We welcome you to a growing family of educators who have come to appreciate the versatility and excitement inherent in the STARLAB. In this section, you will be provided with all of the information needed to successfully set up and operate the Digital STARLAB projection system and dome. In addition, we've included a number of maintenance tips, which will keep your STARLAB system in peak operating condition for years to come.

The staff of Learning Technologies, Inc. (LTI) is not only committed to providing you with the finest equipment available, but with the highest quality service possible. We are always looking for ways to improve our products and service and we would love to hear from you. If you have specific questions, please contact us using the information below.

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In order to keep informed about our latest products, we invite you to log onto our Web site and join our e-mail newsletter, *STARLAB e-News*. Go to:

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Parts List for the Digital STARLAB



Digital STARLAB Projector (lens cap removed).



Projector Remote Control.



DVI - DVI Video Cable (connects projector and laptop).



Projector Power Cord.



Macintosh Laptop Computer.



AppleCare Protection Plan Documentation.



Laptop Computer Shelf.



Laptop Computer Power Cord and Optional Extension (for U.S. only).



Two Speakers. Speaker A (on left, pictured from the back) includes two ports for hook up, Speaker B (shown from the front) has no ports.



Speaker Power Cord.

Also included, but not pictured:

- Power Strip
- Lens Cleaner
- Installation Instructions
- Manuals

Set-Up Instructions for Digital STARLAB

The projection system for the Digital STARLAB is shipped in two boxes: one is the projector case which also serves as the stand for the Digital STARLAB, the other is the laptop computer box. Once the computer is removed from its box, the computer can be placed in a special foam slot located in the main projector case (see Figure 1 on page 7) so that all of the components are stored together. We recommend that you keep all of the computer packaging in case the computer needs to be shipped separately at any point.



Digital STARLAB case.



Digital STARLAB case converted into the projection system stand.





Figure 1. Bottom of case with components in place.



Figure 2. Case top becomes bottom of stand (see photo at right.)



Figure 3



Figure 4

Set up Steps

To set up the Digital STARLAB projection system, follow the steps and photos below. If you are going to be setting up the STARLAB Dome, see page 14 for set-up instructions.

1. Lay the Digital STARLAB case flat on its bumpers so that the telescoping handle is near and parallel to the floor.
2. Open the case by pulling out and turning the keys to disengage the four latches located two on each long side of the case. To do so, pull the key up and turn to the left. Once all of the latches are disengaged, make sure to lay them flat again.
3. Place the top (lid) of the case (the smaller section) on the floor with the foam side down in the center of the dome. This is the base of the stand — Figure 2.
4. Next, remove all of the components from the bottom of the case starting with the projector. After removing the foam over its neck, lift the projector from the sides where there are spaces in the foam (see Figure 1). Place it on a stable surface. Then remove all other components including the computer, two speakers, cables, laptop shelf, power strip and remote.
5. Once empty, flip the case bottom onto its side so that the small latch hook on each long end is parallel to and near the floor.
6. In this position, place the bottom section of the case onto the top section (Figure 3) so that the wheel side of the bottom section and the bumper side of the top section are on the same end. Align the latch hook with the latches — Figure 4. Make sure that the latches are securely fastened and laid flat.

7. Plug in the DVI – DVI Video Cable and the Projector Power Cord the sockets on the back of the projector, left side — Figure 5. Tighten side screws of DVI Video Cable.

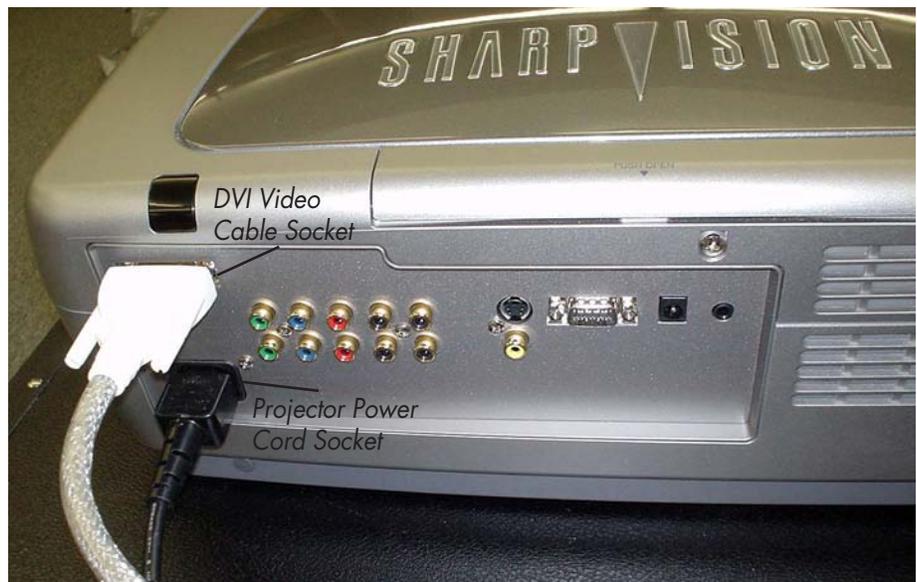


Figure 5

8. With the bottom of the projector facing away from you and fisheye lens pointing up, carefully slide the projector downwards onto the 2 brackets located on the upper left side of the stand — Figures 6 & 7. Both projector hooks should fit securely in the brackets on the stand.



Figure 6



Figure 7



Figure 9. Side view of shelf with side flaps down showing channel on right side.

9. Next slide the laptop shelf onto the bracket on the stand (Figure 6 on page 8) from right to left so that the channel is engaged. Place the laptop computer onto the shelf once it is secure.



Figure 10



Figure 11

10. Assemble the speakers. Only one speaker has ports on it (Speaker A). Plug the white cord from the Speaker B without ports into the righthand port of Speaker A. Then plug the Speaker Power Cord into the left port of Speaker A — Figure 11.

11. Plug in the DVI – DVI Video Cable into the video port on the right side of the computer. Plug the Laptop Computer Power Cord and Speaker Power Cord into the left side of the computer — Figure 12 with insets. The cord with the green plug on Speaker A plugs into the computer's headset jack. Turn on the speakers by turning the knob clockwise on the front of Speaker A. This knob also adjusts the volume level. To turn the speakers off again, turn the knob counterclockwise until it clicks.



Figure 12 with insets.

12. Plug the Computer Power Cord, Projector Power Cord and Speaker Power Cord into power strip. Plug the power strip into a wall outlet.
13. Remove the cap from the fish-eye lens.
14. Turn on the projector by clicking the "on" button on the remote, or by opening up the button panel on the lower end of the projector (Figure 13) and pressing the power button on the far right.
15. Turn on the computer by pressing the power button located in the upper right corner. 



Figure 13

Shutting Down and Packing Up the Digital STARLAB

1. Hit the "Standby" button twice on the projector (in the button panel) or on the remote to turn off the projector.
2. Replace the cap on the fisheye lens.
3. Shut down the computer. To do so, close all applications then choose "Shut Down" under the Apple icon on the menu bar at the top of the screen (far left).
4. Turn off the speakers by turning the knob on Speaker A counterclockwise until it clicks.
5. Unplug the power strip from the wall then remove all of the cords.
6. Remove all the cords from the computer and projector.
7. Close the computer and remove it from the Laptop Computer Shelf. Then remove the Laptop Computer Shelf by sliding it to the right.
8. Remove the projector by lifting it straight up off the brackets and place it on a stable surface.
9. Next, undo the two latches connecting the top and bottom of the case and lay the latches flat.
10. Remove the bottom, lay it flat with the foam side up and replace all of the components in their slot as shown in photo below. Make sure that the button panel on the projector is closed. Replace the foam over the lens neck.
11. Replace the top of the case and secure all four latches. Lay the latches flat.



Digital STARLAB Projector Maintenance

Cleaning the Fisheye Lens

To clean the fisheye lens, use a soft, lint-free lens cloth or Lens Cleaner Tissues. Do not use cleaning liquids or sprays as they will remove the anti-reflective coating on the lens.

Focusing the Fisheye Lens

Your projector lens has been focused at the LTI factory. If the lens has lost its focus, slowly and carefully rotate the lens clockwise or counterclockwise until you see very defined square pixels. It should not need very much tweaking. Do not put your fingers directly onto the lens.

Changing the Projector Bulb

Your projection bulb has a life expectancy of about 2000 hours. If your bulb should blow out, contact LTI for a replacement at 1-800-537-8703 or starlab@starlab.com. To replace the bulb follow the steps below.

Steps to Change the Digital STARLAB Bulb

1. Using a Phillips head screw driver, loosen the two capture screws on the plate on the right side of the projector.
2. Gently remove the plate and put aside.
3. Completely remove the three silver screws securing the bulb. Do not remove the black screw.
4. Grab the wire handle and pull it up. Then gently pull the entire bulb housing straight out.
5. Slide a new bulb back into position, and replace the three screws.
6. Put the plate back on and tighten the two capture screws.



Software Operation

Using the Controls

The controls in Starry Night are grouped in three areas of the screen:

- Toolbar
- Side Pane
 - ~ SkyGuide Pane
- Application Menu

If any of the controls described in this section are missing from your display, reinstall QuickTime and make sure to choose the Recommended Install option.

Toolbar

The toolbar is the strip of buttons above the main window. The toolbar has the following set of basic controls (each set of controls is explained in a later section):

- Time and Date
- Time Flow Rate
- Viewing Location
- Gaze
- Zoom

Side Panes

These panes are along the left side of the screen can be viewed as the following options:

- Favorites
- SkyGuide
- Options
- Media
- Find, info

Selecting an option from the dropdown menu causes that pane to open, revealing a set of controls. Each pane opens to the same width. However, by clicking along the right edge of the pane and dragging the mouse, you can make the pane narrower or wider.

Within a pane, you can expand or collapse various layers by using these buttons:

 Expand layer.

 Collapse layer.



SkyGuide Pane

The SkyGuide pane is different from the other panes. It functions a lot like a web browser and contains its own set of buttons to help you navigate through the pages. The SkyGuide Pane has the following controls:

Navigation

The navigation controls are located at the top of the SkyGuide pane.

	Click Back to return to the page you last visited. Click it again to move back through all the pages you've seen.
	Click Forward to go forward again through the same pages.
	Click Home to go to the main SkyGuide page.
	Click Refresh to reload the initial view in the sky window.
	Click Remove Slides to remove all media playing on the dome.
	Click Table of Contents to display a list of all topics and tours that SkyGuide offers.
	Click Page Forward to move to the next page in SkyGuide.
	Click Page Back to move to the previous page in SkyGuide.

Page Path

To help you remember the way you came, each page includes a menu to show you where you are in SkyGuide.

SkyGuide » Using Starry Night » Important features »
Using the controls

You can click on any link in the path to go back to a section or all the way back to the main page.

Next Page

At the bottom of each page, you'll also find a link to the next page.

Changing your viewing direction »

If you want to read SkyGuide from beginning to end, keep clicking here.

Application Menu

File Edit Options Labels Favourites Window Help

The menu runs across the top of the screen, above the toolbar. Clicking an item in the menu reveals additional options.

Changing Your Viewing Direction

By default, Starry Night always opens with your view facing south, looking slightly above the horizon. You can adjust this view to look in any direction.



The default cursor icon in Starry Night is a hand. When you hold the mouse button down, the hand closes, as if it's grabbing part of the sky. If you hold the mouse button down and drag the mouse, your view shifts in the direction that you moved the mouse.

Zenith and Nadir Markers



If you adjust your view to look high above the horizon, you might see a red marker. This marker identifies the zenith, the point in the sky that is directly above your head. If your view is from a point in space, you can also look straight down to see a marker for the nadir, the point directly beneath your feet. If your view is from a spot on Earth or another planet, you can look only slightly below the horizon, and cannot see the nadir.

Gaze Control

The gaze display in the status bar shows the direction you're looking.

Altitude (Alt) measures the angle above the horizon in degrees. An altitude of zero degree means you're looking straight ahead; 90 degrees means you're looking straight up.

Azimuth (Az) indicates the direction you're facing: zero degrees is north, 90 degrees is east, 180 degrees is south, and 270 degrees is west. You can also use the compass points marked along the horizon to determine your viewing direction.

Location Scroller



The location scroller is another way of changing your location when your view is from high above an object. The location-scroller cursor looks like a compass with arrows radiating from four sides. If you click and drag the cursor, you can move all around an object. This offers fantastic views of the planets and solar system. For instance, if you're high above the surface of Saturn, use the location scroller to turn the planet and see the rings from every angle.

The location scroller can help you get a real sense of the three-dimensional relationships among objects in our solar system and beyond. As you explore the tours in SkyGuide, the location scroller appears automatically when appropriate. In these cases, you can click and drag the cursor to change your perspective. To change the hand tool to the location scroller tool, hold down the Shift key and drag the cursor, or select it from the cursor drag-down menu.

Changing the Date and Time

When you open Starry Night, you see a view of what you would see if you stepped outside at the current time and looked south. The date and time are in the upper left corner of the toolbar.



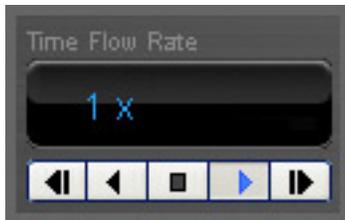
To change the date or time, click it. The date or time lights up and you can type in a new value. To change the month, use the up and down arrow keys on your keyboard. If your mouse has a wheel, you can use it as well.

 A small icon of the Sun appears to the left of the time in the toolbar. If Daylight Savings Time is turned on, this icon is lit up. Click the icon to turn Daylight Saving Time on or off.

If Starry Night is showing a daytime scene, try changing the time to when it's dark. If you already see a night scene, change the time so that it's day.

Customizing Time Flow

By default, time in Starry Night advances at the same rate as real time. If you run Starry Night for one hour, Starry Night's time advances one hour (unless you're in one of the SkyGuide tours where we've adjusted the time rate to demonstrate something). As the time in Starry Night changes, the screen changes to reflect the changing sky.



Changing the Time-flow Rate

Just as nature programs use time-lapse photography to show processes too slow to see in real time, you can speed up or slow down time to get the best possible view of an astronomical event.

The rate of time's flow is shown in the Time Flow Rate section of the toolbar. Clicking the black area to the left of the rate opens a menu that displays a list of possible time steps.

The steps are in two categories: multiples of real time and discrete time steps.

Multiples of Real Time

Time steps that are multiples of real time advance time in Starry Night at a rate equal to a multiple of the real rate of time flow. For example, a time-step of 30x would cause the time in Starry Night to advance at 30 times the real rate.

Discrete Time Steps

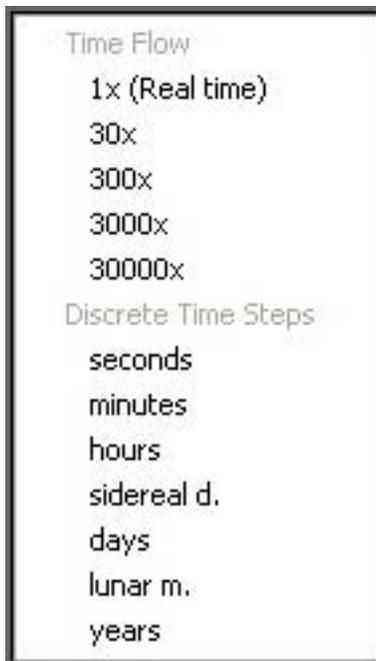
Discrete time steps moves the time by a specific increment every time Starry Night updates the display. Discrete time steps are often useful when you're watching astronomical events. For example, if you wanted to see how Jupiter's position in the sky changes over the next few months, you could set the time to sometime in the evening (for example, 9:00 P.M.) and then set the time step to one day. Starry Night would run time forward, showing the sky at 9:00 P.M. each night. If you had chosen a multiple of real time instead of a discrete time step, you would see an alternating cycle of day and night, instead of seeing the sky at the same time each night.

Some of the discrete time steps listed in the menu might be unfamiliar:

- Sidereal day: This is the time it takes for Earth to rotate once on its axis. It is four minutes shorter than the day we are familiar with, the solar day. Sidereal and solar days differ in length because of the revolution of Earth around the Sun.
- Lunar month: This is the time between two full moons, as seen from Earth. It is about 29 days.

Customizing Time Steps

You are not limited to the time steps that appear in the time step pull-down menu. If you click the numerical part of the current time step, it lights up and you can type a numerical value. This will let you change the time step from one day to seven days, for example.



You can change the way time is flowing using the following controls in the toolbar.

	Click Single Step Backward to move the time backward by one time step and then freeze it.
	Click Backward to run time backward continuously. Each time the screen is updated, the time moves backward one time step.
	Click Stop to freeze time at the current value.
	Click Forward (Play) to run time forward continuously. Each time the screen is updated, time moves forward one time step. This is the default time flow mode.
	Click Single Step Forward to move the time forward by one time step and then freeze it.

If you want to view the sky at a specific time, first click the Stop button, and then type in the viewing time. If you type in the viewing time first, the time shown onscreen might update before you press the Stop button.

There are three short cut keys that play and stop time:

- . = key stops time
- / = routine forward
- , = runs time backwards.

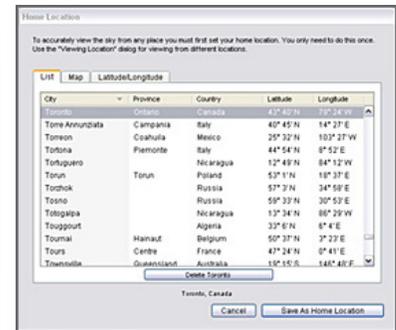
Changing Your Home Location

The first time Starry Night opens, a dialog box opens that asks you to set your home location. Once you have done this, you do not need to change your home location unless you move. To change your home location, follow these steps:

1. Choose Starry Night Small Dome Editon > Set Home Location. This displays a list of cities throughout the world.
2. Use the scrollbar on the right to look through the list. If your home city is listed, click on its name to highlight this city, and click Save As Home Location. If your city is not listed, proceed to step three.
3. Click the Latitude/Longitude tab. Enter your latitude and longitude. You can enter values in degrees; degrees and minutes; or degrees, minutes and seconds. You must also enter a time zone, which are calculated according to the time difference from London, England. For example, all communities on Eastern Standard Time are five hours behind London, so you would enter -5h, if you are on Eastern Standard Time. If you do not know your latitude, longitude, and time zone, click Lookup Lat/Long on Internet for resources that will help you find this information.
4. Once you have entered your coordinates, click Add Location to List. This opens a window where you can enter your city, province or state, and country. Click Add Location when you have entered this information.
5. Finally, click Save As Home Location.

Viewing Location

The viewing location display tells you from where in space you are viewing. If you are viewing from the Earth, your city name will show up in the display. If you are observing from another planet, the display shows this information.





Identifying Objects in the Sky

If you point your cursor at any object shown onscreen, information about the object appears. This is Starry Night's Heads-Up Display (HUD).

Labeling Objects

The heads-up display is great for finding out what a specific object is, but the best way to quickly identify all the bright objects on the screen is to select Labels>Show all labels from the application menu.

To remove the labels, select Labels Hide all labels.

Displaying Constellation Figures

For thousands of years, stargazers have joined the brighter stars together into patterns we call constellations. Astronomers recognize 88 constellations, which together cover the entire sky. Knowing which constellation an object is in is the first step to finding the object.

To turn on the stick figures for the constellations press the K key on the keyboard. Press K again to toggle them off. More constellation display options are located in the Constellations layer of the Options Pane.

Finding Objects

If you are interested in finding a specific object, such as a planet or a bright new comet, select the Find side pane. Click in the text box at the top of this pane and type in the first few letters of the object you are looking for. As you type, Starry Night displays a list of objects that match your name.

Once the object that you are looking for appears in the list, double-click on its name, and Starry Night will centre on the object. Several information fields are listed beside each object in the list of found objects.

Tip

The object you are searching for may be hidden beneath the horizon. If this is the case, Starry Night will offer you the option of hiding the horizon or advancing the time forward to a time when the object will be above the horizon. Objects below the horizon are greyed out.

Searching a Specific Database

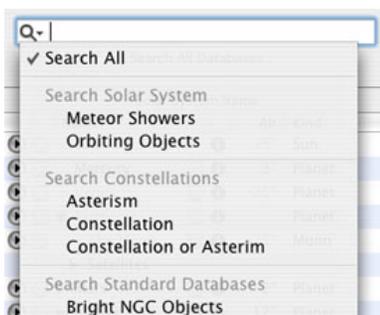
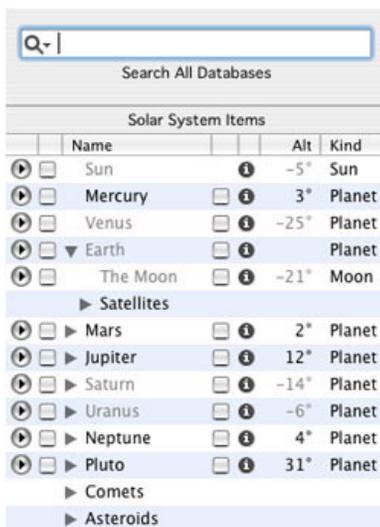
By default, Starry Night searches all of its object databases when you use the Find pane. If you wish, you can choose to search in only a specific database, by clicking the magnifying glass symbol on the left side of the textbox in the Find pane, and choosing the appropriate database from the menu that appears.

Solar System Object List

If you clear the text box at the top of the Find pane, the list of items found is replaced by a list of solar system objects.

▶ Click the symbol to the left of an object's name to expand the list to include all other objects that orbit this object.

For example, clicking on this symbol for Jupiter will expand the list to include Jupiter's moons. Clicking again collapses the list and hides Jupiter's moons. You can double-click on any object in this list to centre on the object in Starry Night main window.



Selecting and Centering Objects

You can open a contextual menu in Starry Night by pointing the cursor at any object in the sky and right-clicking or control-clicking. The contextual menu provides options specific to that object.

Select/deselect: This selects or deselects the object. If an object is selected, its name and an arrow pointing to the object will appear onscreen.

Center: This adjusts your view so the object is at the center of the screen and remains locked there as time passes. This is handy if you want to watch a planet's motion against the background stars, for example. Note: If you are centered on an object and it falls beneath your horizon, your view will be obstructed by the horizon.

Magnify: This zooms in on the object so that you get a close-up view. Objects within our solar system and many deep-space objects have detailed images.

Selecting Multiple Objects

To select more than one object, hold down the Shift key while selecting the next object. This is a handy feature, allowing you to label only the objects you want on the screen. For example, you might only want to display the constellation Orion, label the star Rigel and the deepsky object M42.

Zooming in On Objects

You've learned that you can zoom in on an object by opening its contextual menu and choosing Magnify. Another way to get spectacular close up views of objects such as Saturn or the Andromeda Galaxy is to use the buttons next to the zoom display.

Click the plus button to zoom in closer and the minus button to zoom back out. If your mouse has a scroll wheel, you can also use that to zoom in and out.

The default zoom gives the largest view of the sky, which is 190 degrees. You can zoom in up to 300,000 times!

When you zoom in on objects, you are not changing your location or your elevation. Think of zooming as looking through a powerful telescope, while your feet remain firmly planted.

Determining Distances Between Objects

To determine the distance between two objects as seen from your current viewing position, use the angular separation tool. To use this tool, hold your hand cursor over an object until it turns into an arrow. Then click on that object and drag to another.

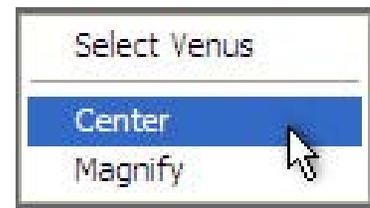
Changing Your Horizon

By default Starry Night shows a photorealistic horizon. However, you might want to change your horizon to something else, perhaps a photorealistic horizon of your backyard that you created yourself.

To change the horizon options, in the Options Pane select Local View > Local Horizon from the application menu. Under Earth horizon you will find a list of different horizons you can try.

Changing Your Elevation

You might want to place yourself at some distance above a planet's surface. You can change your elevation above an object's surface in Starry Night with the elevation buttons in the Viewing Location Display of the toolbar.





The STARLAB Dome

The STARLAB Dome comes in two sizes. The Standard STARLAB Dome is 16 feet (4.8 m) in diameter and has a ceiling height of 10.5 feet (3.2 m) and can easily accommodate about 30 people. The Giant STARLAB Dome is 22 feet (6.7m) in diameter, has a ceiling height of 13.5 feet (4.1 m), and has a seating capacity of about 60 people.*

Before Setting Up the STARLAB Dome

Room Requirements

The STARLAB should always be set up in an open space such as a cafeteria, gym, multipurpose room, or large classroom. The type of room that you select to set up the STARLAB Planetarium will depend on which of the two domes is being used.

The Standard (16-foot) Dome requires a cleared floor space of at least 21 x 21 feet. Therefore, the Standard Dome can fit into many classrooms that have had the desks and chairs removed. The Giant (22-foot) Dome requires an open floor space of at least 27 x 27 feet. As a result of these bigger dimensions, the Giant Dome is most often set up in a gymnasium, large multipurpose room, or cafeteria.

Ceiling height considerations:

- In a room with sprinklers, allow at least 18 inches above the dome
- In a room with incandescent lighting, allow at least 12 inches above the dome
- In a room with fluorescent lighting, allow at least 6 inches above the dome.

When setting up the dome, be sure to avoid blocking the exit paths out of the room.

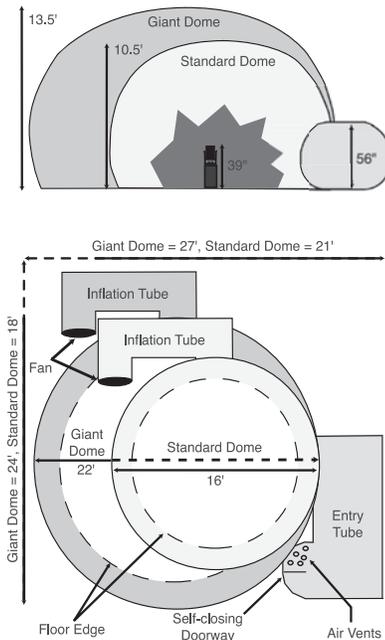
Note

Though tempting, the STARLAB dome should never be set up outdoors. Moisture can damage the fan and projector and direct sunlight on the dome will make it deteriorate faster. In addition, when inflated, the STARLAB dome is quite buoyant so even a slight wind will cause it to shift position.

Preparing the Floor Surface

Because the STARLAB dome has no floor of its own, and participants sit on the floor, it is important to consider the floor surface. Ideally, the STARLAB should be set up on a carpeted floor. This provides maximum comfort for the participants, and reduces wear on the dome fabric. A wood or tile floor can also be used but these are hard and often are cold. When setting up on this type of floor, individuals can sit on carpet squares or pillows to make it more comfortable. It is strongly recommended that the floor of the room be thoroughly cleaned before the STARLAB is set up. Grit and dirt on the floor can cause damage to the dome when you are setting it up and taking it down. Another option is to place gym mats, a large canvas or piece of carpet to cover the floor beneath the dome.

* In the state of Minnesota, State Fire Marshalls have approved a capacity of 21 people for the Standard Dome and 35 people for the Giant dome.



Temperature

The STARLAB has no climate control of its own, so whatever the room temperature is on the outside of the dome basically determines the temperature inside the dome. Because the fan keeps the air circulating continuously through the dome, it is usually several degrees cooler inside the STARLAB than out. Even so, in very hot climates, it is best to set up the STARLAB in an air-conditioned room. If possible, the STARLAB dome should not be set up under skylights or next to windows where direct sunlight can shine on the dome. This may cause the dome to heat up.

Noise Level

While the STARLAB dome is completely light proof, sound can travel right through the material. As a result, the system should not be used in a noisy environment. People in the room outside the dome should be asked to remain quiet so they don't disrupt the program inside the STARLAB. Whenever possible, the STARLAB should be set up in a room that can be closed off from other classes so that they don't interfere with each other. Never attempt to set up the STARLAB at one end of a gym when classes are going on at the other end unless the two sections can be separated by a moveable solid wall.

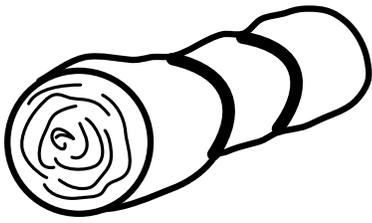
Set Up Time

While an experienced user can usually set up the STARLAB Dome in less than 15 minutes, it is best to allow a full half-hour to unpack and put up the dome. Once it's connected to the fan, the Standard Dome will take about 5 minutes to inflate (about 10 minutes for the Giant Dome). Students who have never seen the STARLAB before are often excited to watch the set-up process. In general though, it is usually a good idea to set up the STARLAB before the class is brought into the room. Deflating the dome and repacking takes about 20 minutes total.

Setting Up the STARLAB Dome

Before Unrolling the Dome

1. Check the electrical outlets that you are planning to use to make sure that they are "live" by plugging in and turning on the fan. Make sure you have adequate space to set up the dome and that you are not near the edge of a stage or blocking a fire exit.
2. Before setting up the dome, unpack and set up the Digital STARLAB and make sure that everything is working properly. (See page 6 for proper procedures). Once the projector has been checked, place it off to the side and proceed with setting up the dome.
3. Decide where you want the entrance and inflation tunnels to be located. Remember the two tunnels are at right angles to each other on the dome. In making your decision, try to envision the traffic pattern that will be created in the room once people start entering and exiting the dome. Make certain that the side of the dome opposite the two tunnels is not next to the edge of a stage or dead ending into a wall. This side must be kept clear in the event that you must lift it for an emergency evacuation.
4. Make certain that the floor where you are setting up the STARLAB is clean and free of grit that can cause holes when the dome is unrolled. If you are going to use a temporary floor covering such as a tarp, rug or gym mat, spread it out on the floor before unrolling the dome.



Inflating the STARLAB Dome

1. Unzip the canvas duffel bag and remove the dome. The dome should have two luggage straps securing it. Remove the straps and put them back into the bag so that they don't get lost. Zip the bag closed and place it in a safe location where you can find it easily when it's time to pack up the STARLAB.

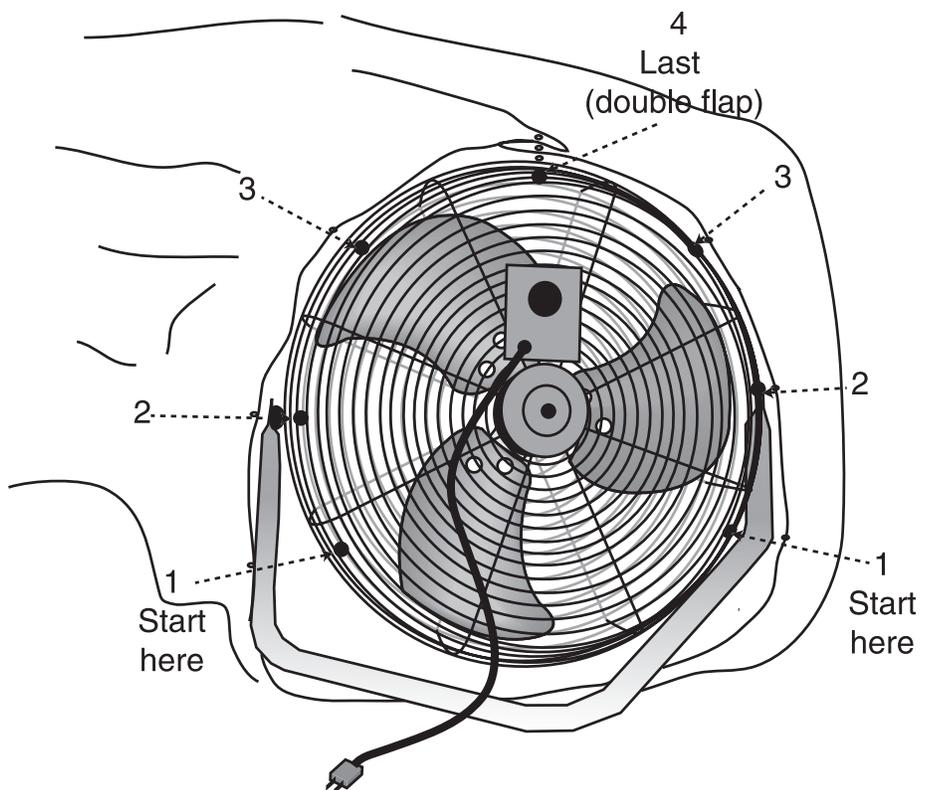
Note

The fan case is useful for storage once the fan has been removed.

2. Start unrolling the dome across the floor where you are planning to set it up. As you unroll it, spread out the material so that you can identify the entrance and inflation tubes. The inflation tube is the smaller of the two tunnels and has snaps around the opening. The entrance tunnel has the STARLAB logo printed on it.
3. Once the dome has been completely unrolled and spread out, turn it so that the two tunnels are in the positions that you have pre-selected. When moving the deflated dome, try to minimize the amount that it is dragged along the floor. Dragging the dome can cause small holes to develop in the fabric.
4. After the dome has been properly oriented, remove the fan from its carrying case and plug it in. The fan can either be plugged directly into the wall or into a heavy-duty extension cord. The fan has snaps around the metal protective cage that line up with the snaps on the opening of the inflation tube.

Note

Over the years, the fans have changed. If you have an older system, the exact procedure for attaching the fan to the tunnel may vary. In most cases, a specific diagram should be found in the fan box. The following diagram shows the most recent fan design.



5. Begin connecting the fan by first attaching the bottom two snaps on the fabric. The bottom snaps are located about 2 feet apart, while all of the other snaps are about 9 inches from each other. After you've attached the bottom snaps, begin connecting the side snaps going up one snap at a time on each side. Finally, attach the single snap on the top of the fan.
6. After the fan has been secured to the dome, turn it on high. As the dome begins to inflate, walk around it lifting it slightly until it starts to take a circular shape. Make sure that the two tunnels are not twisted or folded and that the edge of the fabric inside the dome is completely flat against the floor. You can speed up the inflation process by holding the entrance tube closed so no air comes out. Once the dome is completely inflated, the entrance tube will close automatically. When the dome is fully inflated, it may begin lifting off the floor slightly.
7. Both the inflation and entrance tubes have two right-angled bends in them to prevent light from leaking into the dome. Walk around the outside of the dome and make sure both of these tunnels are "squared off". Also make sure that the back of the fan is set back at least 18 inches from the dome material.

Note

If the fan is too close, the fabric of the dome can block the airflow causing the fan to overheat and the dome to collapse. It is a good idea to place the empty fan box in between the inflation tunnel and the inflated dome to serve as a buffer in case the dome drifts while the program is taking place.

Taking Down and Packing Up the STARLAB

After you have completed your STARLAB presentations for the day, it's time to break down and repack the STARLAB back into its cases.

Note

If you are going to use the STARLAB for several days and it's in a secure room, it is not necessary to completely pack it up each night. Replace the lens cap on the lens of the projector. Pull out the power cords and turn off the fan. The STARLAB will deflate and the fabric will rest on the projector and stand making a "tent". When you turn the fan on again, the STARLAB dome will inflate and then you can plug in the projector, picking up where you left off the day before.

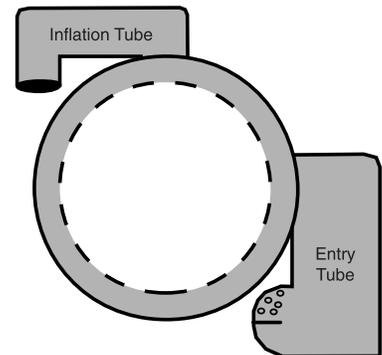
Turn off the projector, computer and speakers and replace the lens cap. The projector will continue to cool off the lamp only while still plugged in.

Note

Do not unplug the projector until the cooling fan has turned off. This can take several minutes. Allowing the lamp to properly cool, will elongate its life.

Exit the dome and turn off the fan. The STARLAB dome will begin to deflate. After it has dropped about 3 feet, go to the side of the dome opposite the two tunnels and lift the material about 5 feet off the ground flipping it back toward the opposite side of the dome. If you do this quickly, the dome will ride back on the air that was trapped inside forming a crescent shaped pile of fabric on the floor as shown in drawing at right. Allow the dome to sit for a few minutes so that the remaining air gets out of it and continue packing up the projection system and fan.

Unplug the fan from the power outlet and unsnap the inflation tube. Wrap the power cord of the fan around the two metal brackets on the back of the fan and place the



Make sure that the entrance and inflation tubes are "squared off" to prevent light from entering the STARLAB dome.

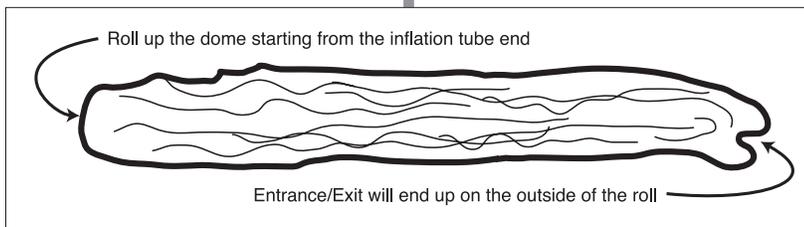
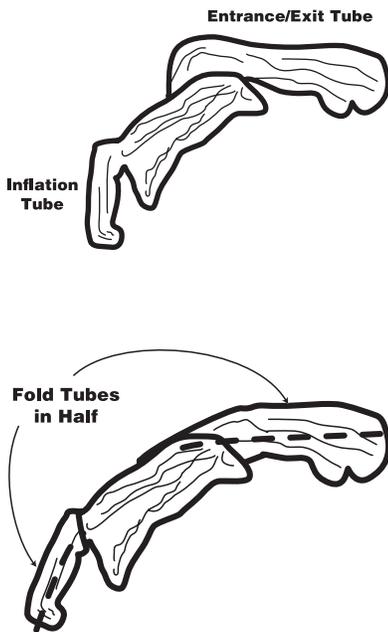
fan inside its box, snapping the lid shut. Place the fan case off to the side so that it is out of the way.

Once the cooling fan has turned off, unplug the projector, computer and speakers from the power strip. Remove the projector, computer and shelf from the stand. Unlatch the stand and place it foam side up on the floor. Carefully repack each system component into the Digital STARLAB case. See Set-up Instructions on page ?? for more information.

Rolling and Packing the STARLAB Dome

While the STARLAB dome can be rolled in many different ways, the following procedure is the recommended method.

1. Once the dome has been flipped over and deflated, it should look like a large crescent shape on the floor with the two tunnels sticking out.
2. Fold the inflation tube over so it lays flat on the rest of the dome material. Fold the entrance tunnel in half lengthwise over on itself, and then fold it a second time so that it is now lying flat on the dome fabric. The dome material should now have a near perfect crescent shape.
3. Walk along the length of the crescent pushing the edges in so that the width of the material is about 3 feet (one meter). Do not make it too narrow or wide because it will not fit back in to the dome bag. Start rolling up the dome like a sleeping bag from the inflation tube end. Remember, the tighter you start to roll, the easier it will fit into the bag! Pause every few rolls to let any trapped air come out. Kneeling or sitting on the dome will help to push the air out.
4. Once the dome has been completely rolled up, secure it with the two luggage straps. Unzip the dome bag and drape it over the top of the rolled up dome. Roll the dome over so the bag is now underneath and carefully zip the bag closed making sure NOT to catch any of the material in the zippers! Store the dome in a cool dry place. Do not store it in an unventilated closet or room that is damp because the canvas bag will get moldy.



Routine Maintenance of the STARLAB Dome

While the STARLAB planetarium system is designed to stand up to repeated use, it does occasionally need some routine maintenance to keep it operating in top form. Here are basic maintenance procedures that should be done periodically.

Dome

The dome is made from a nylon/vinyl (no latex) composite fabric and is bonded together with specially-formulated adhesive. While the fabric is quite durable and does not tear easily, it can get small punctures that allow light to shine through from outside creating extra "stars" in the sky. These holes can be patched using peel-off adhesive backed dome patches found in the accessory box. To patch the dome, inflate it in a brightly lit room and enter with a flashlight. Turn off all the lights inside the dome and

wait for any “stars” to shine through. Since the projector is not on, these “stars” are holes. Peel and stick the patches onto the dome from the inside so they completely cover the hole. If holes are too high to reach, simply turn off the fan and allow the dome to deflate until you can reach the holes. Do not use duct tape to patch holes.

If the dome gets dirty, it can be wiped clean with a sponge while inflated with warm soapy water. Never use cleaning fluids or solvents!

Note

Never stand on a ladder or chair to patch holes. In the dark it’s easy to become disoriented and fall.

Fan/Blower

After several months of use, dust and dirt will build up on the fan blades and motor. This can easily be removed by vacuuming the motor with a soft brush attachment. The nuts on the support bracket of the fan should be tightened periodically with a wrench to keep them from rattling.





Troubleshooting

What happens if I see “stars” shining through the dome even when the projector is turned off?

The extra stars are really tiny holes in the dome. They can be easily patched by using the pre-adhesive peel-and-stick dome patches included in the accessory box. Extra dome patches can be ordered from Learning Technologies Inc. See the section on dome maintenance (page 18) to learn the proper procedure for patching the dome.

STARLAB User Tips

Entering and Exiting the STARLAB

Because the STARLAB dome is an air-supported structure, leaving the door open for an extended period of time will cause the dome to begin to deflate. As a result, it's necessary to have visitors enter the dome in a controlled fashion. Visitors should be instructed to enter and exit the dome in a single file line, one at a time. While they do not have to crawl, they should be instructed to "stay low and go slow". It is always a good idea to have two adults working to assist when students are going in and out of the dome. One adult acts as the "door keeper" on the outside while the second stands inside the STARLAB where the entrance tunnel meets the dome. After every three people enter the dome, the "door keeper" should hold the entrance tube closed for about 5 seconds to give the dome a chance to re-inflate. It is also helpful for the person on the inside to have a flashlight or battery powered lantern that he or she can shine in the tunnel to help illuminate the way. Have the last person entering the dome turn the fan down to medium or low.

Once inside the dome, visitors should be instructed to sit on the floor on the edge of the fabric in a circle. They should not lean back on the dome fabric because it might cause the dome to be pulled down or rock excessively. Nobody should sit in the space directly in front of the fan opening nor should anyone enter the inflation tube. If there are more people than a single circle can accommodate, then visitors can make a second inner circle surrounding the projector. Because the STARLAB does not have any seats, one suggestion is to lay out carpet squares on the floor before the visitors come into the dome. In addition to providing some comfort, the carpets help to define specific seats, which is particularly helpful for younger visitors.

When it is time to exit the dome, the "door keeper" should leave first and hold the dome entrance open for the group to exit. Visitors should exit single file being careful not to trip over the fabric at the end of the entrance tunnel when they leave. When people are exiting the dome, the fan should be on "high."

Accommodating Physically Challenged Visitors

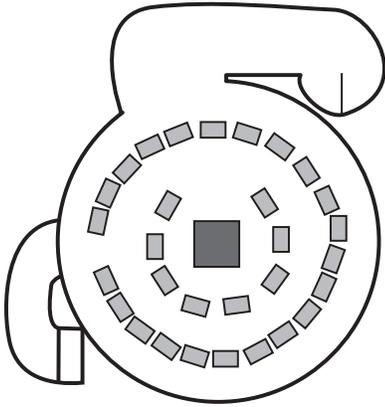
Because of its unique design, the STARLAB can accommodate visitors who are restricted to wheelchairs, have walkers or are otherwise physically challenged. Instead of having these individuals use the entrance tunnel, they can enter and exit the planetarium by going in and out under the edge of the dome. To do this, you will need a second person to assist you. Individuals who are physically challenged should be brought into the dome before the rest of the visitors. Begin by turning up the fan to the highest setting so that the STARLAB dome becomes overinflated and starts lifting off the floor. Remove all carpet squares from the inside of the dome and maneuver the individual to the side of the planetarium directly opposite the point where the entrance and inflation tubes attach to the dome. With the help of a second person, lift the side of the STARLAB and roll the person in the wheelchair under the material toward the center of the dome, next to the projector. Drop the side of the dome back down behind the person and allow the dome to re-inflate. Once the dome has fully re-inflated, have the rest of the participants enter the dome through the entrance tunnel making sure to keep the entrance tunnel clear. Have the last person entering the STARLAB turn the fan back down to low. Once the entire group has been seated, back the wheelchair into the opening to the entrance tunnel. This way, they will be able to



see everything without blocking the view of other visitors. When the program is over, move the wheel chair out of the tunnel and position it next to the projector. Allow the rest of the group to leave via the entrance tunnel and then remove the person in the wheelchair the same way that you brought them in.

Seating Inside the STARLAB Dome

Placing carpet squares on the floor to establish a seating pattern helps to make things more orderly for classes entering the STARLAB. Not only do these pads help to define each student's space, but also they make sitting on a cold, hard floor a bit more comfortable. Carpet squares can usually be obtained from large carpet stores who use them as samples. Quite often, they will donate old samples to schools and other educational establishments. When they do charge for them, they usually cost about a dollar or two each. One typical seating pattern is shown in the diagram at right.



Accessory Lighting Inside the STARLAB Dome

There are many occasions where you might want additional lighting in the planetarium. In order to perform activities like reading star maps and completing worksheets, it is very helpful to use an auxiliary light source. One system that works well for the STARLAB planetarium involves using one or more clamp-on photo lights plugged into tabletop or hand-held dimmers. Both the lamps and the dimmers are available at most hardware and home improvement stores. The clamp-on lamps should have reflectors to direct the light downwards to provide light for reading and writing. This allows images to still be seen on the dome while the lights are on. A second light can be positioned with the reflector pointing upward for general room lighting and for simulating the Sun. These additional lights also make it easier for visitors to see in the entrance tunnel when they enter and exit the dome. The auxiliary lights can be clamped directly to the top of the projector stand or to a board placed under the projector that hangs over the side of the stand. Using the dimmer allows you to adjust the light to the proper level for each activity and it's best to use 40-watt bulbs.

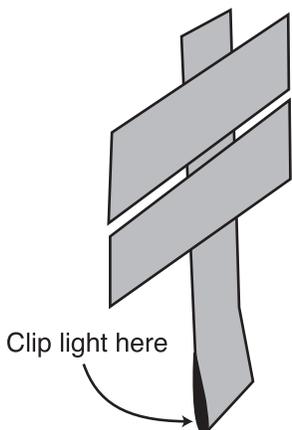
You can vary the arrangement of clamp-on lamps and the color of the light bulbs to suit the needs of the particular lesson that you are conducting. With a blue bulb and the reflector pointing upward, you can simulate a daytime sky. To make it easier for your students to read while they are in the dome, you can use a red bulb with the reflector pointing down.

A six-volt camping lamp or lantern is a perfect addition to help provide extra lighting in the tunnel when people enter and exit the dome. By placing it on the floor at the inner end of the tunnel, people can be directed to "walk toward the light" without tripping over the material or wires. Adding an opaque top cover on these types of lamps turns them into an excellent reading lamp for you to use as well.

Many experienced planetarium users have experimented with far more complex lighting systems that usually involve hanging small lights from the dome itself. Some variations of this include using Christmas tree lights, tube lighting (as found along aisles in movie theaters), or 5-watt bulbs in lightweight, clip on sockets with small metal reflectors. Extension cords plugged into a tabletop or hand-held dimmer, can be extended out to the light positions and taped to the floor to prevent people from tripping over them.

Lights can be attached to the dome either by Velcro or by flaps made from strips of duct tape. The duct tape is folded over so that most of the tape sticks to the dome wall, but leaving a 2 to 3 inch long flap hanging down. Two more strips of duct tape placed horizontally over the first piece adds more strength to the attachment. An optimal height for securing the flaps is about 1.3 meter (4 feet) above the floor.

Flap Made of Duct Tape (for hanging lightweight lights on the dome)



Marking Positions On the Dome

For many activities, it is useful to mark positions as reference points inside the planetarium. You may wish to mark the path of the Sun across the sky so that you can compare the angle of insolation on a winter and summer day. You may also want to have students predict and mark the position of the sunrise and sunset points for different days of the year or mark the position of different constellations as they appear to move across the sky. In the STARLAB, it is possible to mark all of these things using Post-it style notes or index cards backed with double stick masking tape. Students can write their names right on the labels and attach them directly to the inside of the dome. Using this same technique, you can also label the cardinal directions using cards that have the letters written in dayglow or phosphorescent paint.

Pointers

For some activities, you may wish to have more than one pointer available for use. You can divide the group into teams for example, with each team being given a pointer. To help differentiate between the different pointers, you can use pointers with different images such as a lightning bolt, a finger or several different shaped arrows. Learning Technologies also manufactures a heavy duty LED pointer that comes in several different designs. (Part #SL-541, A-J) These LED pointers are better for student use than laser pointers because they are far more durable, have a longer battery life, and most importantly, they pose no risk to eyes even if they are shined directly into a person's face.

Dome Management

Over the course of a day, the dome has a tendency to shift its position on the floor. This usually does not cause a problem but it could make the projector drift off center after a while. In order to minimize the amount of distortion in the projections, it is important that the projector be directly under the center of the dome. Each time a group exits the STARLAB, it's a good idea to go back outside and realign the dome to its original position. The amount of dome shift can be reduced by making sure that there are no kinks, deep wrinkles, or bends in the inflation tube. Placing carpet squares along the inside edge of the dome will help to weigh the dome down which also reduces drift.

Note

Under no circumstances should you ever tape the bottom of the dome to the floor. This will make it difficult to lift the dome in the event that an emergency evacuation is needed!

Creature Comforts

A whole day of teaching in the STARLAB can be grueling. Little amenities can help a great deal. For example, if you like to operate the projector from your knees, a set of gardeners' knee pads help a lot. A short stool (camping stool) or kindergarten chair can also be used if you prefer to sit up and, if you like to sit on the floor, a stadium chair that is really a cushion with a back support works wonders. When all else fails, you can always use a pillow. Having throat drops and a sport bottle filled with water also helps preserve the throat. Take frequent drinks and don't forget to stretch

Safety Features and Information

Safety Rules

In order to maximize the overall quality of your STARLAB experience, ensure safety and make certain that the system components are not damaged in any way, it's important that you always review and follow this safety information when using the STARLAB.

1. The STARLAB should always be set up in an open space such as cafeteria, gym, multipurpose room, or large classroom. Do not set up on a stage. It is not designed for use where exits are blocked or ceiling height is low.
2. Allow at least 18 inches above the dome for a sprinklered ceiling; allow at least 12 inches above the dome for a ceiling with incandescent lighting; allow at least 6 inches above the dome for a ceiling with fluorescent lighting.
3. When setting up the dome, be sure to avoid blocking the exit paths out of the room.
4. Never set up the STARLAB dome near an open flame, incandescent lighting, radiators, space heaters or other heat source. Never allow anyone who is smoking in or near the dome.
5. Students should never be left alone in the STARLAB. The instructor should always be the first one in and last one out of the dome.
6. When leaving the STARLAB dome, the instructor should check to make sure there is no one remaining in the entrance or inflation tubes.
7. Always make sure there is a clear path out of the STARLAB in the event of an emergency.
8. Safety rules and evacuation procedures should be reviewed with the students before the start of each STARLAB lesson.
9. Do not allow food or drink inside the STARLAB dome as it could damage the equipment.
10. Do not set up the STARLAB outdoors. It is not designed to be exposed to moisture and direct sunlight, and even a gentle breeze could move the dome when it is inflated.

Safety Facts

- The STARLAB dome has two means of egress:
 1. through the entrance tube and,
 2. by lifting the side of the dome occupants can exit in seconds because the dome has no floor (see Emergency Procedures, page 26).
- It requires 8 lbs of force to lift the side of the Standard Dome, and 14 lbs of force to lift the side of the Giant Dome.

- In the case of a power outage, it takes 42 minutes for the ceiling of the Giant Dome to settle to a level of 6 feet from the ground.
- The dome fabric passes the NFPA 701 Large Scale Test and the ASTM D6413. This fabric meets the CA fire safety code (Section 13121 of the Health and Safety Code).
- Air circulates through the dome continuously, with a complete fresh air exchange rate of every 6 minutes for the Standard Dome and 24 minutes for the Giant Dome.
- The STARLAB Blower is UL rated.

Recommended Emergency Lighting Options

- Working flashlight.
- Battery back-up UPS (uninterrupted power supply) rated at 180 watts.
- Rechargeable lantern.
- Photoluminescent exit sign.

Emergency Procedures

The instructor should always be prepared with a back-up lighting source such as a working flashlight, a battery back-up UPS, or a rechargeable lantern in the event of a power failure in the STARLAB. If the lights go out, shine the light straight up at the middle of the dome to illuminate the STARLAB. If the fan stops working, the STARLAB dome does not collapse quickly, but slowly starts to deflate. (It takes 42 minutes for the ceiling of the Giant Dome to settle to a level of 6 feet from the ground.) As a result, you have time for someone to make a quick check of the fan to make sure that it is plugged in and turned on. If the fan cannot be restarted, it is necessary to evacuate the dome as quickly as possible. Instead of exiting via the entrance tunnel, have the visitors exit using the following emergency evacuation procedure:

- Have all visitors stand up and move toward the center of the dome. If you are using carpet squares, have each person pick up the one they are sitting on.
- Grasp the edge of the dome fabric directly opposite the side of the STARLAB where the inflation and entrance tubes are located. Lift the fabric up and over the visitors so the dome flips over onto itself. Once in motion, the fabric should continue to bunch up on itself so it falls to the floor between the two tunnels.
- In just seconds, the entire group can be evacuated.

