Which Toy Universe Would A Teacher Want for the Holidays?

- Larry Krumenaker

As a child, I received the most wonderful Christmas toy, Cosmorama. An intricate, heavy plastic planetarium with a star ball that could be set to any day, time, or latitude which projected into a small near-hemisphere (my side was open so one could see the stars!). By gears and worm drives, dials with star maps, day/night hours, latitude indicator moved along with the star ball. I created my first planetarium shows with this toy. I still have parts of this device. I recently wondered if anything like it, of its high quality, was sold today.

Searching the local hobby, toy and education stores, local museum gift shops and online stores for cable science channels, I found a handful of toy planetariums. Knowing that these aren't likely to make up for the lack of a true star projector, is there any real educational value to giving one of these to a teacher to use in a classroom (or to a child)?

To my surprise, I found some to be actually rather useful, even well done. To my non-surprise, many have apparently never undergone an accuracy check by a real astronomer—errors of fact abounded in many a 'star ball' and supplementary materials.

Below are capsule reviews about the units examined The educational value key is to the right. We checked for what astronomical functions were shown by the product, the accuracy of the star fields, construction and safety factors for children (and teachers!), other features and supplementary material provided, and their usability. We tried the units variously in a room the size of a small kitchen, *TCA*'s offices which are perhaps half the size of a classroom, a large room with a high ceiling, and inside a tiny, walls-undecorated alcove between two large rooms.

Technical notes: Every unit but two were battery powered. All were plastic. One company, Uncle Milton, Inc., not only sells its various planetaria under its own brand but it often cross-brands with large science museums or other educational companies which sell the units as their own.

Cool, useful, decently put together.

Not bad, some value, some flaws.

Some limited use perhaps but not a good teaching tool.

Urania would be ticked if you used this….

Create A Night Sky Projector Kit Toysmith.com, $9.99

The least expensive item on our list might have made an interesting afternoon project for some child, but could also be a big frustration, and it is a safety hazard.

The kit is a pair of semi-circular, not-too-stiff cardboard cut-outs with a pretty though not too accurate representation of the northern and southern sky hemispheres, two die-cut sky polar regions and a base with a plastic-encased light. Use a push-pin or pencil to poke holes for the stars in the two equatorial bands and *one* pole cap! Several sharp finger pricks later, we went on to the difficult, tab-and-slot assembling of the spheres—have plenty of transparent tape handy. Since you can only display this as if you were at Earth's poles, you have to choose which stars on which polar cap you don't want to see. The sphere was placed over the base with four sphere-support struts. Because of light leaks where the cardboards come together, major leaking through the missing polar hole, and the off-centered light, your sky is highly distorted and the projected star field isn't useful at all. With no other functions, not even rotation, there's nothing here to see, move along….

Issues: Frustrating, safety hazard. Constellations and star images are all the same size on the cardboard, distorted in the sky. Major light leaks.

Pros: None really.

Discovery Kids Ultimate Star Planetarium store.discovery.com, $79.95

The only toy planetarium that *looks* like a traditional projector! Motorized, can be set for any date, time, latitude, has a go-to mode for setting particular constellations in view and a night mode where it slowly rotates for an hour and then shuts off. A red LCD with 'dot matrix" lettering is your monitor for the Control Panel below it.

Control Panel accesses as a built-in glossary. The Earth Search mode views the sky at any location in its memory, and a Constellation Search shows you a constellation picture and outline and rotates the projector to put it at the zenith, then you can select Star Facts for info relevant to the constellation, history, and astronomy facts in general. Audio tells you what it is doing "Accessing…" but not what data is actually accessed.

Some things make this less than ideal. There are hardly any differences in the magnitudes of the stars shown; first magnitude stars are barely bigger than the faintest ones. Judicious use of an awl fixed that. There is no Milky Way or coordinates to show. The projector is very sensitive to how it is handled and all too easy to strip the gears at worst, lose alignment at best. Every time you use a menu, you have to start at its very beginning or end and repeatedly hit arrow keys to get to where you want to go, no matter how far down the list it is. No shortcuts. An attached projector has planet pictures, but otherwise it does nothing.

Pros: Most versatile for positioning the sky. Impressive looks. Much information though the quality is sometimes dubious. A very good operational manual is provided.

Issues: Fragility of the device, control panel is so-two-decades ago. Virtually no brightness differences in the star display make finding constellations and individual stars a torture.

Sold only online, Discovery brick-and-mortar stores have all been closed.

iOptron LiveStar Mini-Planetarium www.ioptron.com, $69.

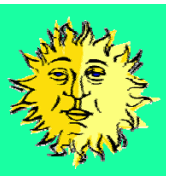
This device is the closest thing to a professional-level planetarium on the toy market. It does few things but it does them well. Runs on a power brick (no batteries), controlled by a remote using a flat CR2032 watch battery which turns the star lamp on (two levels) and off, rotation speed (off, really slow, and fast), and rotation (normal, reverse(!) and stop). That's it. You manually adjust the latitude (there's a latitude scale on both sides' locking knobs) from nearly North Pole to South Pole, if you don't mind having the support-arc block a bar of sky. There is a date and hour setting rings that are accurate on the 'counterweight' where the power cord and infrared receiver are located. A small somewhat accurate compass is on the base for orientation. Has a perfect horizon cutoff.

Shown is the Milky Way, constellation markings, and brighter stars which are created with circular windows as opposed to pinholes, imperfect yet one of the more realistic star fields around. During the day it makes an attractive if reversed celestial globe, dark blue with official IAU constellation boundaries and a chrome-gray plastic base. With small digital LCDs sold for table-top conference room use and a regular laser pointer as arrow, you can do real planetarium shows!

Pro: One of only two units that can do a 180-degree latitude range and with motorized daily motion. Generally accurate star field. No assembly required. One year warranty. Full latitude and rotation motions.

Issues: Light flickers off in some rotational spots. Imperfectly round stars. Three misspellings—Wega, Andromedae, and Triangulum Asu (instead of Aus, for Australis). No idea what to do if and when the bulb burns out—access seems denied.

ScienceTech's Talking Galaxy Planetarium with Night Light elenco.com



The starfield covers only the sky's northern half and only rotates accurately for someone at the North Pole. With about 35 constellations, at least six are misspelled and some misplaced. Awkward constellation figures. It has a built-in, scientifically correct, short audio presentation on the zodiac and the unscientific nature of horoscopes, which is good but since it can't be shut off, it will be heard *every* time the unit is powered up. Reasonably bright.

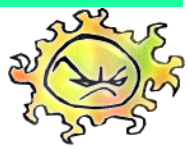
A second hit on the power button brings up night-light mode, a dimmer pair of alternating blue and green lights though the colors are hard to see by the time the light reaches the wall or ceiling. A short cord with 3.5mm headphone jacks is for attaching an audio device, which dies cut off the anti-horoscope talk. The speaker volume can be controlled but the speakers are low quality and muddy.

Comes with 1) a CD with Cyber Sky, a decent ten-year-old star charting program, though not for young kids; 2) a small red flashlight that the box seems to indicate is a pointer with a visible beam but of course it isn't. Not a very good pointer, either.

Once sold by National Geographic, NGS sells a newer model but it looks to function little differently. For a $43.95(!) planetarium, it makes a nice but expensive nightlight.

Pros: the CD. **Issues**: Deceptive box artwork, non-flexibility of functions.

Uncle Milton's 3D Star Theater unclemilton.com $39.99



Essentially a desk paperweight disguised as an 8-slide projector. Four non-3D images of planets and nebulae and four 3-D maps of the seasonal skies. The star maps actually looked to be interesting—stars, Milky Way, labels and mythological drawings—but the optics are so bad one could only focus one part of the map at a time. The 3-D aspect worked on the focused area but so what? There are no supplemental materials—no CD, no poster, no booklet—and thus nothing to do with the projections but look and struggle with the tiny, out-of-focus details. This is money better spent elsewhere.

No **Pros** other than maybe as an entrance-way slide projector. **Issues**...too many.

Uncle Milton's Death Star Planetarium unclemilton.com $29.99

If you are a Star Wars collectable fanatic, you'll love this. A two-part (some assembly required) model of the Death Star, when you flip off the top part you have a tiny halogen light illuminating a clear plastic dome with the Star Wars galaxy showing all your favorite planet names and trading routes. Oh, teacher, you want reality? Put the flimsy plastic star field over the attached-by-screws Star Wars dome and project the sky (dimly) on your ceiling. Don't let the fact that the constellations will all be backwards deter you! And it is non-rotating and set for Earth's North Pole, where you don't live.

Pros: The starfield hemisphere is actually fairly accurate in star pattern so you could use it like a kind of celestial "globe" except it is so small you have to be within inches to look at the stars clearly.

Issues: Just about...everything. Avoid this one unless you are a Star Wars junky. Needs adult help to assemble, with tiny lights and screws.

Uncle Milton's Star Theater 2 unclemilton.com $29.99

We were pleasantly surprised with this device but also wondered why Uncle Milton only went halfway on designing this product which could have been so much better.

The Star Theater 2 is a clear plastic ball on the end of a battery holder that functions as the rotation control and axis. The stars, labels and constellations are all white opaque areas painted/embossed on the

star ball's exterior. In general the constellations are correctly positioned, with fairly standard line drawings. Magnitudes are displayed oddly in three size groups—all magnitude 0-2 or 3 in one size, then a middle size, then all others. One star in Capricornus is the size of the stars in Pegasus, and all Cygnus' stars are the same size, matching Deneb, indicating general sloppiness in the design process, which is then contrasted by the fact that this was the only star ball with not a single misspelled star or constellation label.

The star ball fits in a bowl uniquely topped with a cityscape horizon cutoff—truly original. But: a cheap compass that orients the device doesn't work well; the rotation axis comes with a movable hour band to set against the imprinted calendar dates but the instructions are repetitive, confusing...and don't set the sky correctly—the unmovable months are misplaced. Uses AAA batteries, the only planetarium tested that uses this smaller size.

An odd thing—the brighter stars are further embossed with glow-in-the-dark paint, which they recommend you can use outside. Well, you could, if you only use the stars when they are on the *far* side of the star ball because, like a good star ball should be, the star patterns are backwards on the side nearest you.

Comes with a small hand projector with nearly identical comet and meteor slides, though tiny white comet on white sky doesn't really work well. An arrow slide would be a good addition.

Since the ball is clear, you are projecting the sky as a photographic negative—white sky with black stars and labels. While not realistic it is actually a pretty decent teaching tool for (small) rooms where you can not get it totally dark. In a semi-lit, cloudy-sky-illuminated room, we could clearly project the part we were interested in studying onto a wall. A probably unexpected bonus is you can write on the star ball! China markers and non-permanent whiteboard markers can be used to draw the ecliptic, current planetary positions, and the Sun and Moon wherever and whenever you want!

Issues: Rather cheaply made stand won't stand up to hard usage. The screws that hold things together, including the battery cap, are ridiculously small and easily lost (or swallowed by small children). Battery in the meteor 'flashlight' gets very hot quickly. Sky and meteor/comet images unrealistic. Date ring just totally wrong. Supplemental guidebook is erratic in quality in instructions and content; correctly contains planetary data for the three dwarf planets and location information up to 2015 but is riddled with factual misstatements and errors. These include that the star ball shows the ecliptic when it doesn't, 99% of all stars shown are within 100 light years (they aren't!), etc. There is a CD with an interactive 45-minute audio tour of the sky of decent quality with pauses and planetarium settings given, but refers to an activity guide not supplied.

Pros: Unrealistic sky in terms of black and white imaging and weird magnitudes are more than made up by its positional accuracy and versatility. First, you can draw on it. Second, sky rotation shown well. Third, can be used in brighter than usual 'dark' rooms. Last, take the star ball out of the bowl and show how the sky changes with latitude. Has a realistic horizon silhouette and the 10-track audio CD might make the basis of a good slide show or lesson.

It is being replaced by Star Theater 3, which is similar in function but comes with the otherwise free software Stellarium for ten extra dollars.

Summary: Only three (iOptron, Discovery Channel, Uncle Milton's Star Theatre 2 [ST2]) have the (adjustable) traditional sky motions of latitude shifting and rotation. The most realistic and accurate sky is iOptron's but the most teacher-friendly is ST2, even with its many flaws, because of the ability to write on the star ball. None have any planetary, Sun or Moon in-the-sky projectors. Now what we really need to find is a good classroom homemade dome. Readers, have any good ideas? Email us! TCA