CONSTELLATION

Fall 2018, No. 3

Vermont Planetarium Presents World's Largest Astronomy Lecture

By Oliver Ames

Guinness World Record attempts come in all shapes and sizes, and the most difficult record to break is one that involves over 1,000 people. Coincidentally, this is exactly the type of record we broke, and we did it in Northeastern Vermont, a part of our state that has been called "Vermont's deadend" and suffers from the highest unemployment rate and lowest wages in the state. Thanks to the incredible efforts of our visitor services manager Jen and many volunteers, we are currently pending a Guinness World Record for the World's Largest Astronomy Lecture. We were shooting to break 1,104, and we smashed the record with an audience of roughly 1,701.

To understand why this event was so remarkable for us, you have to know a little bit about our institution. The Fairbanks Museum & Planetarium consists of a small backyard, a preschool, outdoor butterfly house, staff building, collections building, two story taxidermy natural history museum, and a planetarium with a twenty-foot dome that is currently not handicap accessible. We are also located on a main street that is rather small compared to most other towns of 8,000. On an average day in September we see twenty people through our doors, and our normal event attendance is roughly thirty to 150 people. We have our fair share of challenges.

That's not to say we don't have a lot going for us though! For one, we have a department of three meteorologists who do forecasting and broadcast on Vermont Public Radio throughout the day, and for another, we are one of the most far reaching educational institutions in the state. We see 12,000 students and 800 teachers annually. This all means we have built up an incredible amount of good will in Vermont and in our local community, but turning that good will into planetarium and museum tickets remains a challenge.

This all started in the Winter of 2017 when our brand new visitor services director Jennifer D'Agostino came up with the idea to do a spectacular block party style event around the Perseid Meteor Shower in August. Quickly, this morphed into attempting to break a Guinness World Record. Jen had already broken a record before for the World's Largest Three Legged Race (she got a little over 300 people to participate) so she already had a little experience with the Guinness

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CONTACT!

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President's Message

As Autumn spreads across the MAPS region and many of us settle into another academic year, I am excited to provide some updates for the coming year.

Remember that elections will take place in January for the positions of President-elect, Treasurer, and Secretary. Please consider running for one of these positions, and contact the Elections Committee (Patty Seaton, Paul Krupinski, and Steve Shipley) soon if you have questions or want to be added to the election slate. Candidate bios will appear in the next edition of *The Constellation*.

During the January election, you will also be asked to approve adding the Memorial Committee to our By-Laws as an official committee. I established it as an ad hoc committee at the MAPS 2018 conference, but we would like to make it an official committee to coordinate remembering colleagues who pass.

Several weeks after the MAPS 2018 conference, I had the honor of representing MAPS as our affiliate representative at the 2018 International Planetarium Society Conference in Toulouse, France. Several topics were discussed at the IPS Council meeting before the conference, and if you haven't already, I encourage you to learn about the IPS Vision 2020 Initiative. There is an update from August on the IPS web site or Google "IPS Vision 2020". This was my first IPS conference, and I recommend that everyone try to attend these international conferences if they are able. In addition to a healthy MAPS representation, interacting with and learning from colleagues from around the world was an unforgettable experience. The next IPS conference is in 2020 in Edmonton, Canada. Two proposals have been submitted for the 2022 IPS conference. Bids from St. Petersburg, Russia, and Houston, Texas, were presented. I will give more details about each in the next issue of *The Constellation*, and I will ask for feedback to bring to the vote at the IPS council meeting next summer.

Speaking of conferences, I am excited to announce that our regional conference for 2019 will be a joint conference with the Southeastern Planetarium Association! **SEPA-MAPS 2019 will take place June 4 -8 at the South Carolina State Museum in Columbia, SC.** Among other exhibits, the museum houses the BlueCross BlueShield of South Carolina Planetarium – a 55 foot diameter, 145 seat digital planetarium, and the Boeing Observatory containing several telescopes including a 1926 12 3/8-inch Clark Refractor. Conference

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MAPS EDUCATION COMMITTEE

Lee Ann A. Hennig, Chair

Dear MAPSers,

Fall is making its arrival to our region and with it are some opportunities to take advantage of the night sky to inspire and educate our audiences.

"Stories in the Stars" fits in beautifully with Susan Button's activity on page 13. The investigation involves the students in recognizing and plotting the positions of selected constellations during a rotation cycle and at different latitudes. The activity's extensions relate to cultural variations of the constellations, the importance of certain star groups, and how they were used to determine time and seasonal changes. This is a perfect example of the significance of our **"Stories in the Stars"** theme.

For our **"Questions That Lead to Lessons",** what better time of the year to explore the following questions that your audiences might consider:

1. What is the Autumnal Equinox?
2. What does the word "equinox" mean?
3. Why does the Autumnal Equinox occur on a certain date and at a different time of the day each year?
4. Why do we sometimes refer to it as the September Equinox?
5. What is the Harvest Moon?
6. When does it occur?
7. How did it get its name?
8. Why does the Moon sometimes look red or orange-like a Pumpkin, when it's rising (or setting)?

All of these questions can have various levels of answers depending on your audience, but that's the challenge in our profession- how do we engage our partners in this unique experience under the dome and make it informative, meaningful, and fun. Please consider sharing your ideas with the MAPS Education Committee. Good Luck!

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President's Message (Continued from page 2)

host and Planetarium Manager Liz Klimek has already begun assembling an exciting conference, and MAPS President-elect and Program Committee chair April Whitt will be working with Liz to plan a great conference!

As always, please contact me if you have any questions or suggestions about how MAPS can better serve you -- and how you can better serve MAPS. Remember that MAPS is not some corporate organization in a far off city. MAPS is the accumulated passion, experience, and talent of all of its members. Please share your passion, experience, and talent with all of us! If you have not yet been a very active member of MAPS, consider submitting an article, lesson, or neat story to *The Constellation*, posting questions or ideas to MAPS-L, or running for a MAPS office. If you are already very active, think of ways to help get other members to be more active. Together, *we* are MAPS. MAPS is currently a strong organization in the planetarium field, and it is up to all of us to make sure it continues to be as we move forward.

Kevin Williams
MAPS President

NOMINATIONS

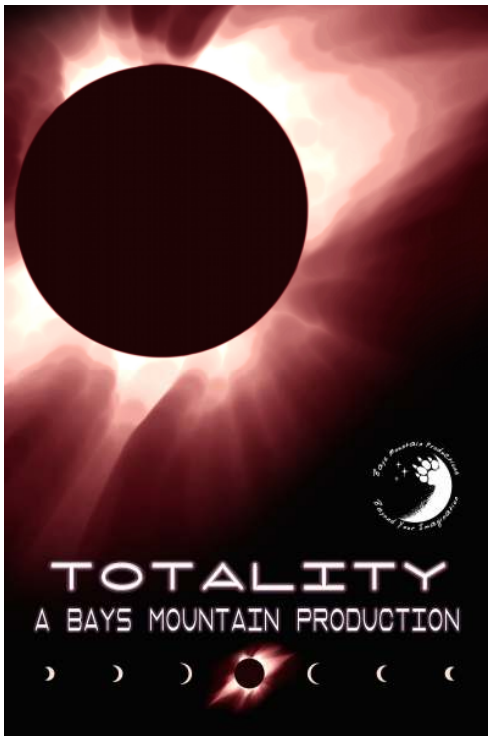
We invite you to participate in a key activity for the Middle Atlantic Planetarium Society — the nomination of new officers. MAPS is committed to building a large and diverse pool of candidates, and that can only happen with your participation. The deadline for nominations is NOVEMBER 1, 2018! We are looking for a slate of individuals for PRESIDENT-ELECT, SECRETARY, and TREASURER.

MAPS encourages your participation in this process. When presenting a nomination, please be as thorough as possible regarding your knowledge of the nominee. MAPS welcomes self-nominations as well. It takes only a few minutes to fill out the nomination form on the MAPS website, but the impact is lasting. For specific questions, please contact:

Patty Seaton, Elections Committee Chair, pxts13@yahoo.com
Paul Krupinski, Audit Committee Chair, mobiledome1993@earthlink.net

Election information from MAPS By-Laws

- Officers shall be elected on a mail-in or electronic ballot by the membership in January.
- Terms of office shall be for two years.
- The President-Elect, Secretary, and Treasurer shall be elected in odd-numbered years, and the Board Members elected in even numbered years.
- All nominations must be submitted in writing or by e-mail with the “second” submitted in writing or by e-mail by **November 1st**.



CONSTELLATION DEADLINES

The Constellation is published quarterly near the equinoxes and solstices. Please keep in mind the following deadlines:

Cover Date	Deadline
Sep. 2018	Friday, Sep. 7
Dec. 2018	Friday, Dec. 7
Mar. 2019	Friday, Mar. 1
Jun. 2019	Friday, Jun. 7

Submissions should be sent to the editor:

Kevin Conod
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Vermont Planetarium Presents World's Largest Astronomy Lecture

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record system. What we would later learn was that for events of over 1,000 people, the requirements are plentiful: video recording all entrances and exits, stewards that are not affiliated in any way with the Museum for every group of fifty people, zoned areas for each group of fifty people, two official time keepers, turnstile or barcoded counting, a chief witness, a piece of study material for every participant, and on and on. The rules and regulations were a nightmare and quickly changed the scale of our event form that of a small potato sack race to a behemoth, the likes of which the Fairbanks Museum has never seen. Somehow though, we waded all the way through the red tape and figured out how to move 1,700 people into counted, stewarded areas in less than forty-five minutes.

So on August 10th at 5:30 PM, we closed down Main Street and our event began. With a closed road, we afforded ourselves much more space for food trucks and activities. The churchyard across from the Museum became our record attempt space and would not be opened till 45 minutes before the 8:15 start. In that churchyard, a twenty foot high wooden stage had been built by our exhibits manager with a reflective surface for the projector. Our 50, non-museum affiliated stewards would later be briefed on their jobs, given folders and official high visibility bibs so participants would know where and who they were. We had local sheriffs, EMTs, plenty of non-steward volunteers, and a whole lot of good will built up over years and years of providing quality programing at a low cost. Through all this madness we sold tickets to our Planetarium for four dollars per person. With five shows, almost all sold out, we were able to offset some of the event cost.

One of my fantastic presenters and a fifteen year Museum employee, Bobby Farlice-Rubio, performed the lesson. He focused primarily on the history of Astronomy, covering Galileo and using an extremely powerful blue laser to point out Jupiter in the sky (don't worry, we turned off the street lights). He also discussed Demeter who sits on top of our State's capitol building and her connection to Virgo which was a nice touch, bringing the constellations down to Earth. People loved it.

When the event concluded, we had smashed a record and even managed to break even. It was a remarkable achievement for us, and the only way we were able to survive the onslaught of 1,700 people was through our constant fear that something would go wrong.

(Continued on page 17)

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IPS members are a vital part of the society. As volunteers, they head committees, spearhead projects, and contribute. As a member, you can make a difference.

Biennial IPS conferences bring together hundreds of planetarium professionals from around the world for paper sessions, invited speakers, workshops, panel discussions, vendor demonstrations, and exhibits. Our next conference will be held 18-25 June 2020 in Edmonton, Canada.

Dues for individuals are US $65 for one year or US $100 for two years. For more information or to join IPS, contact Ann Bragg, IPS Treasurer/Membership Chair, at ann.bragg@marietta.edu. Join electronically by visiting the IPS website at www.ips-planetarium.org.

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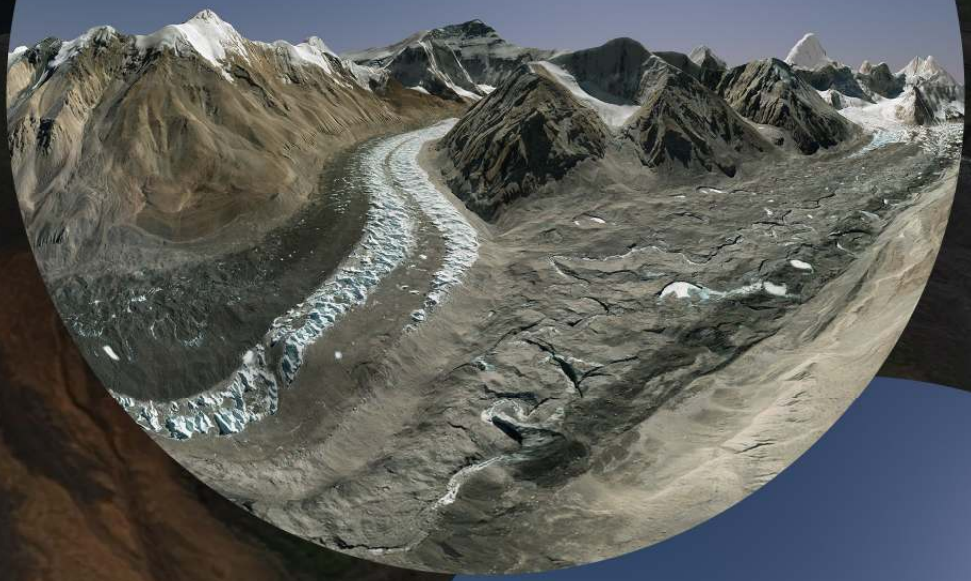

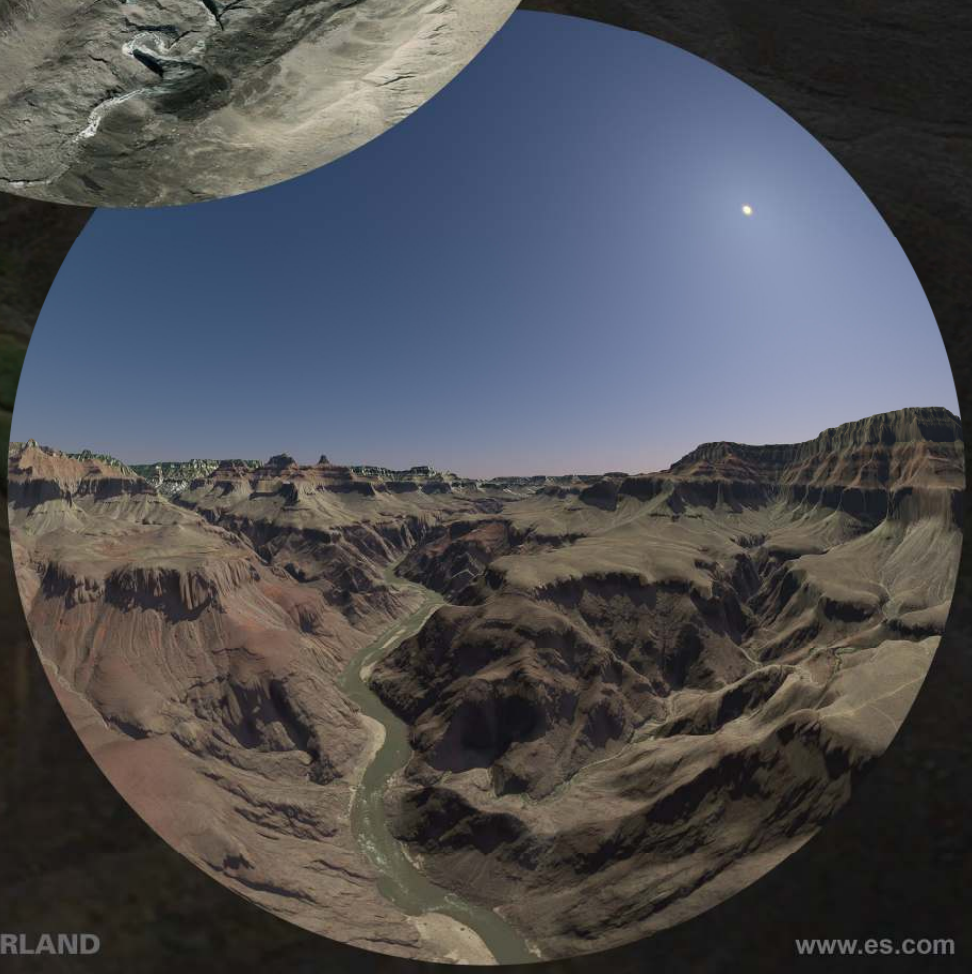

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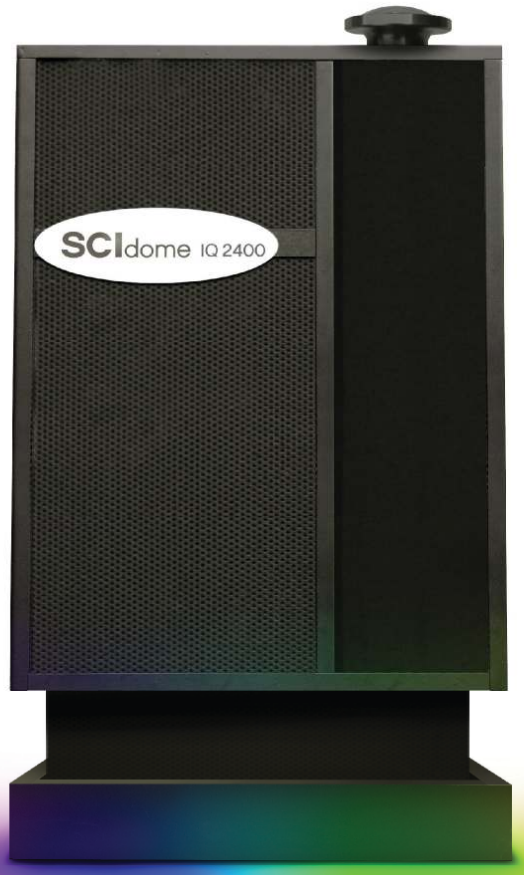

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Celestial Motions

Target Age: 14 and above
Author: Susan Reynolds Button
Quarks to Clusters, 8793 Horseshoe Lane, Chittenango, NY 13037 USA
Phone: 1- 315- 687- 5371 **E-mail:** sbutton@ocmboces.org

During this lesson the planetarium will be used as a laboratory. The lab activity involves locating and recording apparent celestial motion of four easily identifiable stars at "home" latitude and at selected other latitudes. With the information collected students can then calculate the average hourly apparent motion and as well as the latitude of the observer. The Lesson Extension addresses how knowledge of apparent celestial motion is reflected and passed on in the sky stories of various cultures.

Concepts:

- The Big Dipper can be used to find the North Star (Polaris).
- The position of a celestial object can be noted by giving it an azimuth and an altitude measurement.
- Due to Earth's rotation, celestial objects appear to move 15 degrees per hour through the day and night in a dependable pattern.
- Polaris can be used in the Northern Hemisphere to find the direction of North and the Latitude of the observer. Positions of stars appear to be different at different latitudes.

Objectives/ Evaluation Tool:

1. Students will be able to determine directions in the Northern Hemisphere night sky by locating the Big Dipper and the North Star.
2. Students will be able to estimate the horizontal (azimuth) and vertical (altitude) angles for objects in the sky during a six-hour sequential period.
3. Students will be able to explain the nightly apparent motion of the circumpolar constellations in the North and seasonal constellations in the South. (and the changes at different latitudes)
4. Students will be able to calculate the average hourly apparent motion (15 degrees per hour) of celestial objects and be able to state that this apparent motion is caused by Earth's rotation.
Students will be able to describe the relationship between the observer's latitude and the measured altitude of Polaris. (The altitude of the North Star = the latitude of the observer.)

Vocabulary:

rotation, apparent motion, horizontal angle, azimuth, vertical angle, altitude, Polaris, circumpolar

Materials Needed:

planetarium, data sheets, writing boards, lights for reading, pencils

Lesson Outline and Tips for Success:

1. Locate four easily identifiable stars at your "home" latitude. (Choose the North Star and then one star for each of the remaining directions.)
2. Have students write the names of these stars in the appropriate places on their data sheet.
3. Measure and record the horizontal and vertical angle for each star 3 times, two hours apart for each measurement. (The Starlab planetarium projector diurnal motion motor is set so that 15 seconds = 1 hour.)
4. After some practice observing and recording, students can try to predict where the stars will be in two hours.
5. Have students make some statements about what they observed.
6. Calculate the average number of degrees of hourly motion due to the rotation of the earth. (Divide the number of horizontal degrees that each star appeared to move by six.) Polaris is the exception, why?
7. Observe again the nightly motion of the starfield: eastern sky, southern sky, northern sky and Polaris. Polaris appears to stay in the same place all night.
8. Ask students what their latitude is and ask them to compare that answer to the altitude of the North Star. Have students state the relationship between the altitude of Polaris and their latitude.
9. If time permits, observe and record apparent celestial motion at different latitudes and note differences. Calculate the latitudes of each location after estimating or measuring the altitude of the North Star.

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Extension: Have students research and examine relationships between apparent celestial motion at different latitudes and "sky stories" that the various cultures tell at these different latitudes.

TIPS: If you are using a portable planetarium, the data sheets can be handed out and discussed before entering the planetarium. For safety's sake, all the rest of the materials should be handed out inside the planetarium. Note:

Student Worksheet: See the template on last page of this article.
H.A. = Horizontal Angle; V.A. = Vertical Angle

Teacher Information for Lesson Extension

We can show how knowledge of apparent celestial motion is reflected and passed on in the sky stories of various cultures. Note: All of the cultures mentioned here could be found at basically the same latitude and could see the same stars. We used the winter sky for this part of the lesson because it has the most similarities among cultures and in this season there are more bright stars and distinctive patterns. Before this discussion, students should already have a basic grounding in Greco/Roman mythology.

The ancients used information in the sky because they noticed a relationship between what they saw and what was happening on Earth:

- *Direction*-the North Star and the Sun rise and set positions allowed people to find the four cardinal directions. These directions were many times related to the cycle of life on Earth- East represented birth, South represented childhood, West represented adulthood and North represented the time of old age.
- *Time*-by noting positions of basic patterns at different hours people learned to mark the passage of time on Earth in predictable increments.
- *Shapes*-some of the same shapes seem significant to most cultures in their story telling. Each culture used storytelling to define certain stars or patterns in the sky. These stories were used to pass along knowledge, signals of the changing seasons, the history of their civilization, and their belief system as well as to reinforce their political system.

1. Greco/ Roman Stories: If we briefly review the Greco/Roman stories we can note themes present in these characters and stories. Some examples include: direction/latitude indicator (North Star-small bear), family unit (king, queen, daughter, twins, bears), compromise (twins, Perseus), repeating cycles (circumpolar bears), opposites (twins), gods interfere with lives of humans (Orion-three stars, Cassiopeia), political unit (king, queen, princess), signs of the season (Aquarius, square of Pegasus)

2. If we examine Native American Indian stories we can notice that the political system represented in the constellations is different. Community living units are much smaller and as a result there are many tribes and each tribe may have a different story for the same group of stars. We have fewer records of the stories. We can have students look for familiar themes (ideas) or shapes (people, objects, animals): family unit and repeating cycles (first woman, first man), direction/latitude indicator (Home Fire), contrast (Place of Decision), signs of seasons (rabbit tracks, butterflies and lizard), bears, male chief-3 stars, rabbit, and dog.

3. When examining Chinese stories we note that the political system is different from the Native American people and more like the Greco/Roman culture. As a result there are more universal stories across China. The sky is used more as an almanac by this culture. You can again have students look for familiar themes (ideas) or shapes (people, objects, animals): family unit/ political unit (Emperor, Empress, Crown Prince, Prime Minister), Repeating cycles (Basket of wisdom), male warrior-3 stars (Tsen), dog (wild jackal), square (four towers)

(Continued on page 15)

4. By examining African/Egyptian stories we notice that the political system is different again and community living units much smaller again in the African culture. As a result there are many units and each unit may have a different story for the same group of stars. We have fewer records of the stories. The Egyptian culture, on the other hand, was based more on a city state government. Have students look for familiar themes (ideas) or shapes (people, objects, animals): family unit/ political unit (Osiris-male figure with three star belt, Isis-his wife), opposites (male/female beasts), repeating cycle (wheat=north star, turnips and ancestors' eyes circle), dog (jackal)

5. If we review what we discovered we can see that there here are many similarities across cultures. Each star pattern though can represent many different things. The Big Dipper can be: a saucepan (French), a plough (British), an upside down elephant or giraffe (African), a skunk or fire (Native American), a bear (Greek). Cassiopeia can be: a queen (Greek), first woman (Native American), five canoes or a fish (Polynesians), reindeer horns (Northern Canadians), hands of Fatima (Saudi Arabia).

6. So, patterns in the sky are named because they mean something significant to the particular culture. The shepherd, farmer or sailor watched the sky each day and night and noticed everything (colors, brightness, times of rising and setting, relationships to the seasonal changes and tasks that needed to be performed) and stories were passed on from one generation to the next. This was a means of passing along information and instructions for seasonal activities as well as cultural beliefs. Sometimes the stories included explanations of natural events and fostered respect for the political system and ancestors. And, there are many similarities across the cultures.

Students could make their own constellations and write stories that show significant relationships between their constellations and what is happening on Earth, in nature and in our culture, today. Are we still concerned with some of the same things as the ancients? What animals live in our part of the world? What political system do we have?

Why connect mythology to our lessons about other topics? There are a multitude of reasons to consider: to establish relevance or a connection to everyday life - past and present; to teach survival skills; to explore and appreciate cultural differences; to evoke creative thought and imagination; to maximize the time by providing cross-curriculum connections or it's simply fun and interesting.

Note: Worksheet follows on the next page.

Student Name_____ Date_____

Celestial Motions

Latitude_____

H.A. = Horizontal Angle V.A. = Vertical Angle

Star Name:	**Time:**	**Time:**	**Time:**
Northern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Eastern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Southern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Western Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.

Student Name_____ Date_____

Celestial Motions

Latitude_____

Star Name:	**Time:**	**Time:**	**Time:**
Northern Star	H.A	H.A.	H.A.
	V.A.	V.A.	V.A.
Eastern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Southern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Western Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.

H.A. = Horizontal Angle V.A. = Vertical Angle

Student Name_____ Date_____

Celestial Motions

Latitude_____

Star Name:	**Time:**	**Time:**	**Time:**
Northern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Eastern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Southern Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.
Western Star	H.A.	H.A.	H.A.
	V.A.	V.A.	V.A.

H.A. = Horizontal Angle V.A. = Vertical Angle

Vermont Planetarium Presents World's Largest Astronomy Lecture

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That fear made us double check everything we implemented and even caused us to make last minute changes that saved the day. We likely won't do another event like this; at the very least not a Guinness event (remove the rules and regulations and things get a lot easier). Regardless, we learned a lot and came out of it famous in Vermont.

If you'd like to be updated when we official hear we have broken the record, check https://www.fairbanksmuseum.org/planetarium/stargazing-party. If you'd like to get in touch with me, feel free to email oames@fairbanksmuseum.org. Heck, if you plan on breaking our record, send me a note and I'll see what advice I can offer.

Hamilton Planetarium Scholarship

Heather Bradley, starting her senior year at Penn State University, has received the twelfth scholarship awarded by the Hamilton Planetarium Scholarship Fund. She also has made Penn State the first institution to have two scholarship winners.

These scholarships are open to all United States citizens or legal residents attending accredited educational institutions in the United States or possessions.

For more information about the Hamilton Planetarium Scholarship Fund, see: planetariumscholars.webs.com

Dates to Remember

31 December. Deadline of the prize "Page of stars" organized by IPS Portable Planetarium Committee in collaboration with Serafino Zani Astronomical Observatory: http://www.ips-planetarium.org/?page=italy

IPS is seeking submissions for the competition, "Pages of Stars."
The goal of this competition is a to build a collection of short audio clips (maximum 3-5 minutes each) that can easily be shared among planetarians using mp3 files. Planetarian colleagues from around the world are invited to prepare a short text, in English, that can be read under a planetarium dome.

31 December. Deadline for the contest "A Week in United States." For information and host requirements go to http://www.ips-planetarium.org/?page=WeekinUS. Each year two planetariums in the United States host a planetarium colleague from another country for **A Week in the United States**, an initiative supported by IPS as an excellent opportunity for professional development and cultural exchange.

A Week in the United States

An Intersection of Art and Science on the Space Station
by Mario Runco

Large and powerful telescopes have delivered stunning images of our Galaxy and the universe. A little closer to home, my colleagues have taken some equally stunning photographs of our own planet from the International Space Station.

My name is Mario Runco, and I'm an Earth scientist and former space shuttle astronaut. After seeing our beautiful home planet from orbit, I wanted to be able to share the experience with everyone, so one of the NASA accomplishments of which I am most proud was helping to spearhead the creation of the WORF – the Window Observational Research Facility on the ISS.

My colleagues, Dr. Dean Eppler and Dr. Karen Scott, and I envisioned a small facility, about the size of a large refrigerator that would enhance the capabilities of the large Earth-viewing optical quality window that we were previously successful in getting aboard the station. This vision became reality as the WORF was launched to the station in 2010 on board the STS-131 mission of the Space Shuttle Discovery.

Jeff Williams, Expedition 13 Science Officer, at the U.S. Laboratory Science Window on the ISS.

The optical quality window and the WORF are a perfect blend of art and science. They allow us to conduct Earth science research and capture amazing, high-resolution photographs of the Earth.

The window is located in the U.S. "Destiny" laboratory module and features the highest quality optics ever flown on a crewed spacecraft. It is 20 inches (51 cm) in diameter, and includes a non-optical quality, retractable pane that protects it when it's not in use but still allows natural light into the station and provides a great view for the crew.

The WORF is capable of housing a variety of sensors within the shirt-sleeve environment inside the space station. These sensors can be used to study atmospheric, oceanic, and surface terrain conditions as well as make environmental health assessments. Observations made from the WORF can also provide important data on transient atmospheric and geologic phenomena such as tropical cyclones and volcanic eruptions. It can also serve as a testbed for the development of new sensor technology.

The WORF's presence on the space station also allows its sensors to image the same location or region multiple times over several days. This allows for observations that can show for example, how vegetation below may be changing from day to day. Subtle changes detectable by orbital sensors, that might be indicative of declining plant health, are rarely visible on the ground in their early stages and often by the time they are, it is too late and crops or even forests may be lost.

My colleagues and I are all avid Star Trek fans, and we decided to name the facility "WORF" after the honorable Klingon warrior. We designed a mission patch that included Klingon script for the acronym WORF, and even an alternate version with a depiction of an astronaut bearing an uncanny resemblance to Science Officer Spock making observations of the Earth from the WORF.

For more of the many wonders that can be observed from Earth orbit, go to nasa.gov/iss-science. For more information about WORF, see worf.msfc.nasa.gov. This article is also available on YouTube as a video: hyoutu.be/1MDw2zrbAAs

For similar, out-of-this-world stories, visit science.nasa.gov.

Source: Science@NASA