The Astronomy of Harry Potter

Presented by

Mitzi Adams
aka Professor McGonagall

and

Melissa Snider
aka Professor Sprout

The Faculty of the
Von Braun Astronomical Society
(standing in for Hogwarts School)

have conferred upon

_____

this

Ordinary Wizarding Level
In
Astronomy

with all the rights and privileges thereunto appertaining.

In Witness Thereof This Diploma is Awarded by the Faculty.

Given at the Von Braun Planetarium of the Von Braun Astronomical Society in Huntsville, Alabama, October 2014 in the Sixtieth year of the Society.

_____ _____

Professor Melissa Snider "Sprout" Professor Mitzi Adams "McGonagall"

Andromeda Tonks

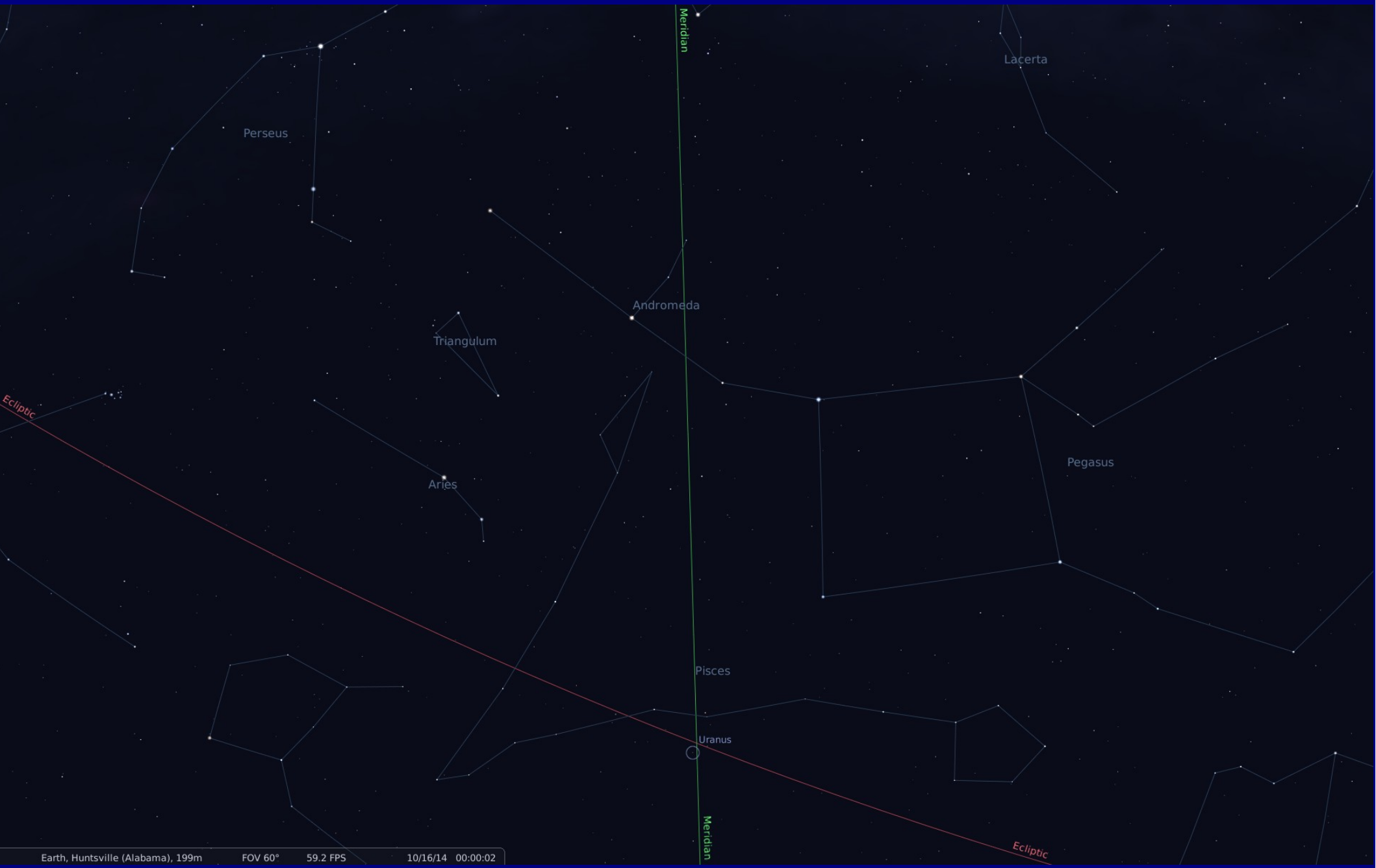
Regulus Black

Sirius Black

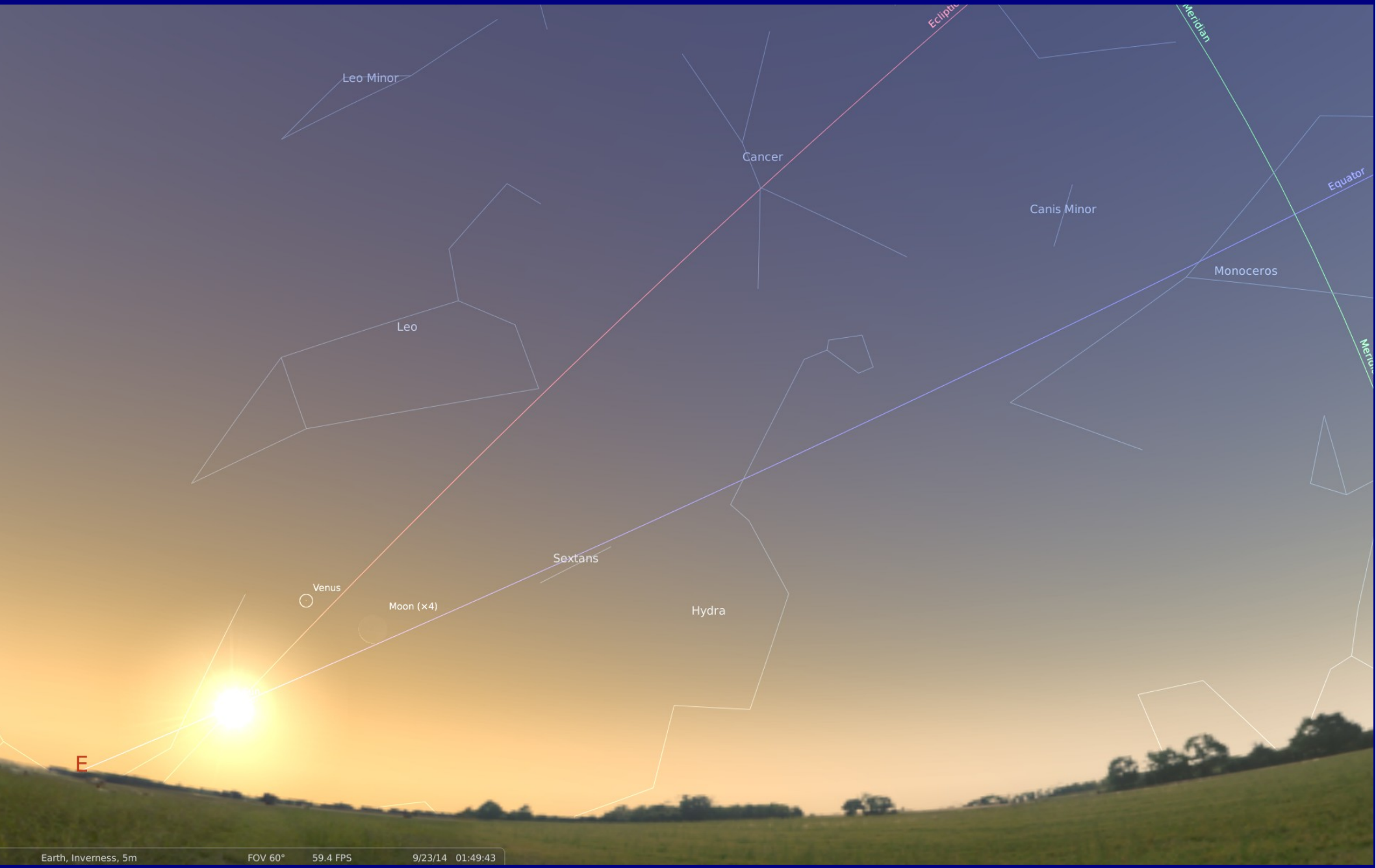
Draco Malfoy

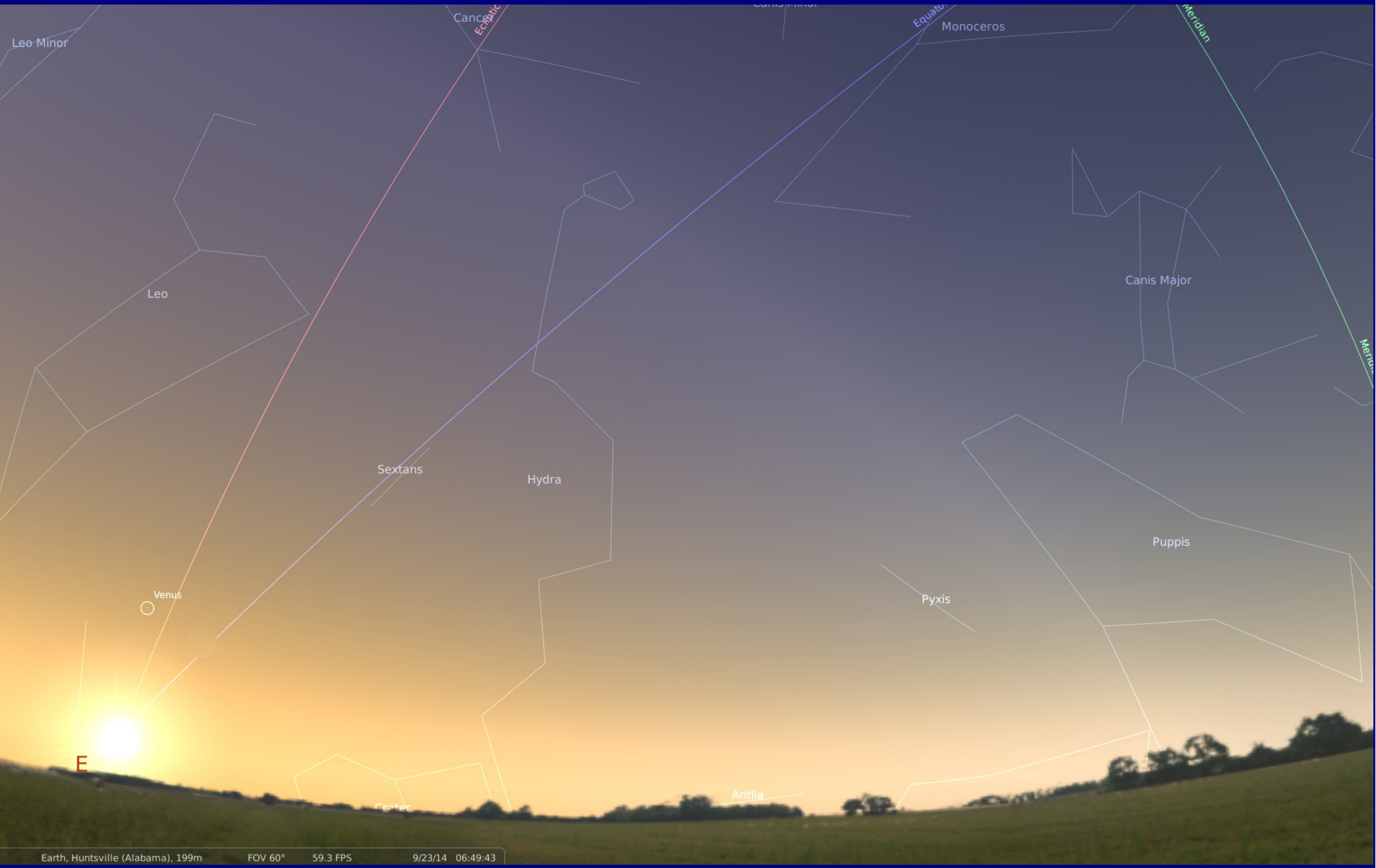
Bellatrix LeStrange


Ophiuchus
Meridian
Spica
Libra
Saturn
Corvus
Antares
Scorpius
Lupus
Centaurus
Norma
Telescopium
Circinus
Hadar
S
Earth, Miami, 1m
FOV 60°
58.9 FPS
5/24/15 03:55:38


Meridian
Lacerta
Perseus
Andromeda
Triangulum
Ecliptic
Pegasus
Aries
Pisces
Uranus
Meridian
Ecliptic
Earth, Huntsville (Alabama), 199m
FOV 60°
59.2 FPS
10/16/14 00:00:02


Meridian
Dubhe
Ursa Major
Lynx
Cassiopeia
Camelopardalis
Mirphak
Perseus
Algol
Capella
Menkalinan
Auriga
Alnath
Castor
Pollux
Cancer
Gemini
Meridian
Earth, Inverness, 5m
FOV 60°
59.2 FPS
10/12/14 00:00:43


Leo Minor
Cancer
Canis Minor
Monoceros
Leo
Sextans
Venus
Moon (×4)
Hydra
E
Earth, Inverness, 5m
FOV 60°
59.4 FPS
9/23/14 01:49:43


Leo Minor
Monoceros
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Earth, Huntsville (Alabama), 199m
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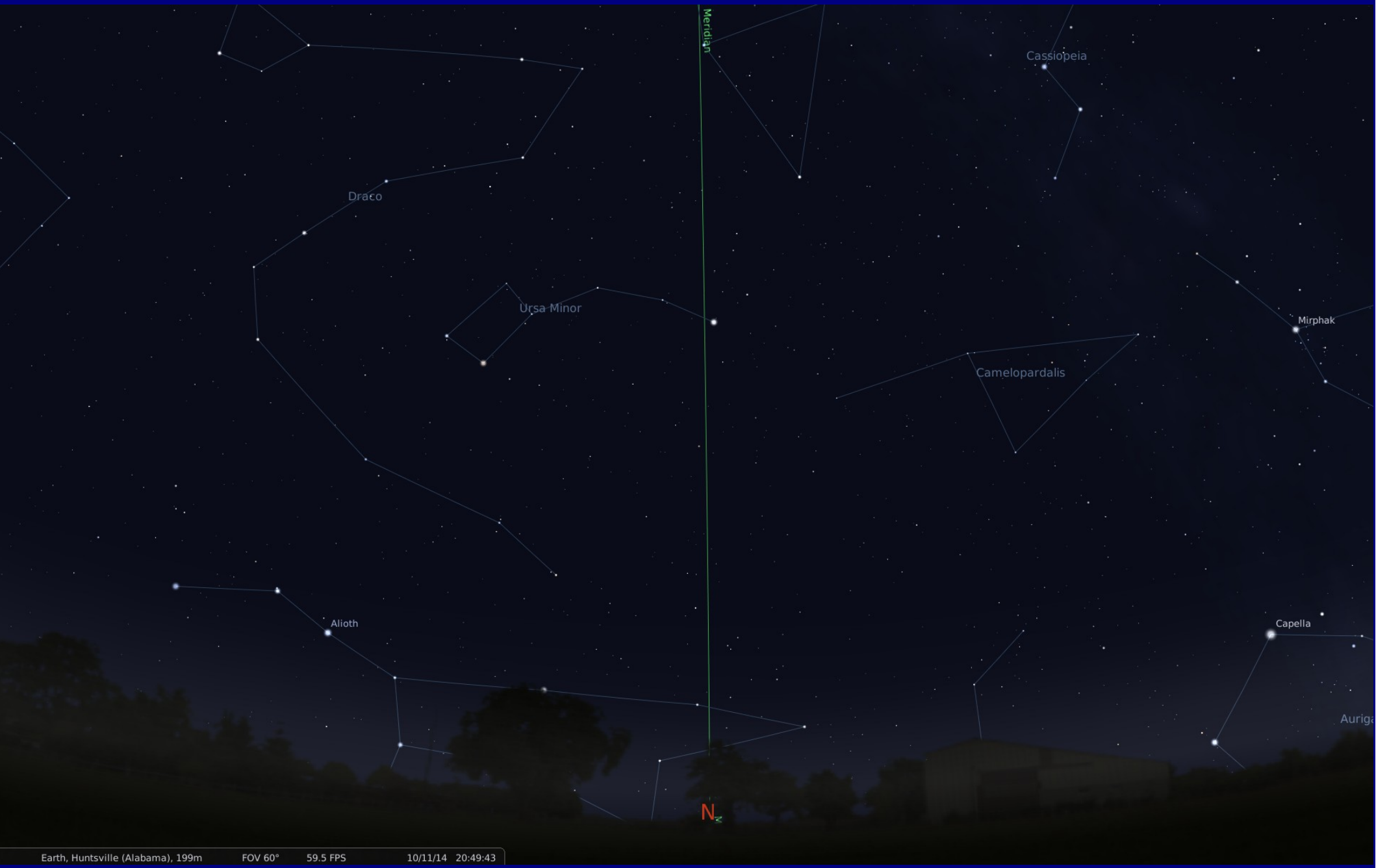
Meridian
Cassiopeia
Draco
Ursa Minor
Mirphak
Camelopardalis
Alioth
Capella
Auriga
N
Earth, Huntsville (Alabama), 199m
FOV 60°
59.5 FPS
10/11/14 20:49:43


Ecliptic
Mars
Saturn
W
Earth, Huntsville (Alabama), 199m
FOV 60°
59.2 FPS
10/11/14 18:38:39


Meridian
Deneb
Ursa Minor
Kocab
Dubhe
Ursa Major
Draco
Alioth
Vega
Lyra
Alkaid
Canes Venatici
Hercules
N
Earth, Inverness, 5m
FOV 60°
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Harry Potter Astronomy
2014 October 11, 25

PRESHOW Staging (meet 6 pm)

a. Dry ice (green light?) – Melissa
b. Black capes
c. Mitzi, McGonagall – square spectacles
d. Melissa, Sprout (brown) or generic Sprout/other professor hybrid
e. Posters of key constellations to put on walls - Melissa
f. Overall show premise: astronomy class at Hogwarts
g. Set planetarium for midnight October 15.
h. Cue-up DVD to Dragon segment
i. Set planets

Astronomy events in October:

7 October	Uranus at opposition
8 October	Moon Full at 10:51 UT
	Total Lunar Eclipse, U1 09:14 UT, Greatest 10:55 UT, U4 12:34 UT
8-9 October	Draconids Meteor Shower
22-23 October	Orionids Meteor Shower
23 October	New Moon
	Partial Solar Eclipse , P1 19:37 UT, Greatest 21:44 UT, P4, 23:51 UT

Astronomy events in November:

The Philae lander of ESA's Rosetta spacecraft will be released sometime in November.

5-6 November	Taurids Meteor Shower
6 November	Moon Full
17-18 November	Leonids Meteor Shower ~15/hr
22 November	Moon New

Astronomy events in December:

6 December	Moon Full at 12:27 UT
13-14 December	Geminids Meteor Shower ~120/hr
21 December	Solstice 23:03 UT
22 December	New Moon at 01:36 UT
22-23 December	Ursids Meteor Shower ~5-10/hr

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
05:00		**VBAS INTRO:** who we are, items in gift shop, membership, next show, flashlights off, cell phones off, relax and suspend disbelief.
	Fade up Sun (?)	**SHOW INTRO:** We're here to talk about the astronomy of H. Potter. But the world that J.K. Rowling created is a make-believe world, which could be classified as a modern day myth. To make her myth seem more real, she describes the experiences that many children have who attend school in England, Scotland, and Ireland. A part of the education system in the schools of those countries involves taking tests at the end of secondary or pre-university education. Passing "A Levels" confers a secondary-school leaving qualification. Similarly in Harry Potter's world, to graduate from Hogwarts, Harry has to pass his

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	Sky at midnight	"OWLs", Ordinary Wizarding Levels that include an OWL in astronomy. Constellation and star names in the Muggle world (that's non-wizarding folk to you uninitiated) come mostly from Greek and Roman myths and from Arabic. J.K. Rowling has used many of these for her character names. In addition, many creatures and situations are similar to those of Graeco/Roman mythology.
	Remember to take book -- H. Potter in Latin	For example: Andromeda Tonks, Regulus Black, Sirius Black, Draco Malfoy, and Bellatrix LeStrange, all of these first names refer to either stars or constellations. In our show tonight, you will learn about the stars and constellations from which these characters were named. J.K. Rowling directly tells us that astronomy was important at Hogwarts. I'll read a little from the first book of the series, *The Philosopher's Stone:* media nocte die Mercurii semper eis caelum nocturnum per telescopia observandum erat et

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		discenda erant nomina stellarum variarum et motus planetarum. Whoops! wrong book... “They had to study the night skies through their telescopes every Wednesday at midnight and learn the names of different stars and the movements of the planets.”
	mid_hsv_10152014.png or mid_hsv_10292014.png	**ASK AUDIENCE and WAIT for REPLIES:** So, what could we see on Wednesday, October 15 (or October 29) at midnight? The Moon will be waxing gibbous in the east, Andromeda will be directly overhead and Uranus would be slightly southeast of Algenid in the southeast corner of Pegasus. The summer triangle will be low in the northwest, Draco will be low in the north. Let's now take an imaginary journey to the area where Hogwarts might be located. We are

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	mid_inv_10122014.png	currently located in Huntsville at about 34.7 degrees north latitude. Our imaginary journey takes us to 57 degrees north latitude.
		ASK AUDIENCE and WAIT for REPLIES What do you notice about the sky? How is it different from the midnight sky in Huntsville?
	Divide group into four "houses"	Now that we are here at Hogwarts, and this is your first trip, you must be divided up into your houses. These will be: **Aries, Leo, Sagittarius, and Pisces**
	eq_inv_09232014.png	Students, you are ready for your first astronomy lesson. This slide goes backwards in time to the fall equinox that happened on September 22/23. What do you notice about the time? Sunrise was at about 5:58 in the morning.

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	eq_hsv_09232014.png	There are two lines on the image, one is the celestial equator, the other is the ecliptic. The equator is just a projection of Earth's equator onto the sky. The ecliptic is the plane of Earth's orbit around the Sun. From Earth, the Sun appears to move along the ecliptic, you'll find the planets and our Moon there as well. When the Sun appears in the sky at the place where the equator and the ecliptic cross, we have equinoxes -- there are two of them, six months apart, one in September, the other in March. When the Sun appears at the place where the ecliptic and equator are farthest apart, we have the solstices, one in June, the other in December. For comparison, this was sunrise on September 23 in Huntsville. What do you notice about the angular height of the equator/ecliptic (and thus the Sun) above the horizon?
		Because here at Hogwarts we are so far north, the Sun is much lower in the sky than in Huntsville AL

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	DVD: Dragon clip	Harry, Ron, and Hermione study the sky to learn constellations and the motion of the planets. One constellation that has a direct connection to a major character is Draco, the dragon. Remember Draco Malfoy? Low in the north, is where you will find Draco. He's not a very bright constellation but his tail curves in between Ursa Major and Ursa Minor, the big and little bears. In the U.S., we refer to them also as Dippers. In Greek mythology, Athena, the goddess of wisdom and intelligence, was attacked by a Dragon. Athena defeated the dragon and threw him into the sky where he remains to this day. Dragons in the Harry Potter world were a bit more substantial. Let's watch this clip that shows us one such dragon.
	Give "points" to houses, keep score...highest score wins a prize... Draco Malfoy (also part of Black	Now class, settle down. How many of you know how to find Polaris? (identify Polaris, it's altitude, Ursa Minor/Major and pointer stars)

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	family) Dragon – relative of snake (fr. Latin, Draco, Draconis = snake or dragon) Cassiopeia - (another Black family member), mythological evil as vanity Point out these constellations	There are other constellations close to Polaris, that are relatively easy to spot: Cassiopeia and Cepheus. In Greek mythology, Cassiopeia was punished by Zeus for being vain, so half the year she is upside down on her throne. Cepheus the King was married to Cassiopeia and their daughter was Andromeda, whom they attempted to sacrifice to a sea monster. Andromeda was saved by Perseus. Sirius Black was the grand-nephew of Cassiopeia Black and Andromeda Tonks was grand-niece of Cassiopeia Black. Perseus was not mentioned in Harry Potter.
	DVD: Buckbeak clip	The characters in Harry Potter can give us clues to other constellations, some are not direct comparisons, but very similar. Watch this clip.
	Point out Andromeda	Attached to Andromeda is Pegasus, a winged horse in Greek mythology, and the steed that Perseus used to rescue Andromeda. Buckbeak in the H. Potter world was "tamed" by Harry in much the same way as Pegasus was tamed by Perseus. And -- Buckbeak saved Sirius Black from having to return to Azkaban.

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		There are some bright stars in the sky too. Low in the west, we see Altair in Aquila the Eagle, Deneb in Cygnus the Swan, and Vega in Lyra the Harp. These three stars are referred to as the Summer triangle, because they are directly overhead in Summer. Before we take a look at the eastern sky, let's do a little review. **REVIEW, Ask Students to answer** -- award points: 1. What constellation contains Polaris, the North Star? 2. Which constellation could be compared to Buckbeak, rescuer of Sirius Black? 3. What is the name of this star, brightest of Cygnus the Swan? 4. What is the name of the constellation that in Greek mythology was King Cepheus' Queen?
	DVD: Cue-up Centaur Clip	Now in the eastern part of the sky, we see the Moon and Castor and Pollux (more eastern star) of the constellation Gemini. In the Harry Potter story, there were the Weasley twins. Also Pollux Black

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	Sirius' animagus = big protective dog	was the brother of Cassiopeia Black and the grandfather of Sirius Black. We can also see Orion, a hunter. The bright red star Betelgeuse marks one of Orion's shoulders and the bluish star Bellatrix marks the other shoulder. The bright blue star Rigel is at one knee and Saiph at the other. The belt stars are named Alnilak, Alnilam, and Mintaka. Note that the area where his head should be is rather empty. Rather like Hagrid's half-brother the giant Grawp. Above Orion, we can see the "V" of Taurus the bull, with his bright red eye, Aldebaran. If we rotate the sky just a bit, the brightest star of Canis Major, the Big Dog appears -- that star is Sirius.
		I. Explain daily sky motion II. Discuss the reason for seasons **ASK STUDENTS:** (Award points to houses) 1. Why do stars move? 2. Why do we see different constellations at

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		different times of the year? 3. In what constellation do we find the star Sirius? 4. What are the names of the two shoulder stars of Orion?
	Rotate sky back to just after sunset, Centaurus must be in the sky. DVD: Play Centaur clip Negative Latitude back to Huntsville and a bit (~10 degrees north)	As we finish the year at Hogwarts, it's time to make the journey back home. But to finish your astronomy education and get ready for your OWLs, we still have a little unfinished business, so please be patient. While we journey a bit to the south of Huntsville, let's watch this video clip.
	centaurus.png centauri_stars.jpg	Other schools of magic see different stars, depending on where on Earth the school is located. We are visiting one now, close to Miami, Florida in order to see the constellation of Centaurus. Actually, this time of year, Centaurus is in the sky during the day, we need to visit Miami in May to see Centaurus above the horizon when it's dark. Look at this star...you've probably heard of it, it's called Alpha Centauri. Alpha Centauri is actually three stars, not just one, but we'd have to use a telescope to see them all.

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		The star system is about 4 light years away from Earth. Alpha-Centauri A is a little larger than our Sun, but very similar in color. Alpha-Centauri B is a little smaller and cooler than our Sun. The two are in an egg-shaped orbit around each other. Their closest distance from each other is 1.04 billion miles: roughly the distance from the Sun to Saturn. Proxima Centauri is actually the closest star to us, but Proxima is a cool red dwarf star, much smaller than the Sun, its mass is about 1/8 the Sun's . Proxima is about 1.2 trillon miles away from Alpha-Centauri A and B. Proxima is so far away, it takes about 500,000 years to complete one orbit!
	cent2.jpg	These two stars, Alpha and Beta Centauri, are known to many people of the Andes mountains in Peru as the Eyes of the Llama. Note that in May, 2015, Saturn will be visible in the

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		south eastern part of the sky a few hours after sunset. **REVIEW:** (Award points for correct answers) 1. How many stars in the Alpha-Centauri system? 2. Which of the three stars in the Alpha-Centauri system is the largest? 3. Which of the three stars in the Alpha-Centauri system is the smallest?
		4. What is the name of the star that is closest to our solar system?
	Fade up Planets Fade up ecliptic mars.png	Planets Now that we are back in Huntsville, let's see which planets are visible here tonight. Location, location, location (ecliptic) -- where do we look for the planets? The planets will be found along the ecliptic.

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
	jupiter.png	Tonight and for the next couple of nights, we can see Mars and Jupiter low in the west at sunset. We've already found Uranus, which is below Algenib in Pegasus. Around 2 a.m., look for jupiter to rise in the east.
	Bring up lights, but not all the way	You have almost earned your OWLs. We have some house activities to complete first. I'd like all Aries House to stay here in the planetarium (place Venus & Jupiter on star charts) All the Leos will follow ?? to the observing field All the Sagittarians will follow ?? to the C-16 All the Pisces will go up to the parking lot with ??. We will rotate clockwise in ten minutes.

Time	*Visuals/Planetarium Machine/Audio -- Other Instructions*	*Script*
		Aries->parking lot Pisces->observing field Leos->C-16 Sagitarrians->planetarium

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POINTS FOR HOUSES

Aries	Leo	Sagittarius	Pisces

Aries	Leo	Sagittarius	Pisces