

Driftless Dark Skies Initiative: Training Astronomy Educators¹

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Abstract: The Driftless Dark Skies Initiative is training and supporting a cohort of a dozen astronomy educators who make use of the unique resources of the Kickapoo Valley Reserve to inspire and inform school groups and the public about the night sky and space exploration by offering nature programs and public star parties.

Background: The Kickapoo Valley Reserve is over 8,500 acres of protected property located in southwestern Wisconsin in Vernon County. KVR sees over 14,000 visitors annually for low-impact recreation including biking, hiking, horse-back riding, and birdwatching. It has proven to be an excellent environment for astronomy education. It has a thriving Education and Events Program which hosts 6000 students of all ages for hands-on nature education. The Visitor Center includes classrooms for indoor learning while its trails, woods, and prairies offer an outdoor classroom. Most importantly, KVR enjoys some of the best dark skies of Wisconsin. It is far from the light pollution which disconnects urban residents from the night sky. With the adjoining Wildcat Mountain State Park, it is a proposed Dark Sky Park. KVR has partnered with Star Stories to train astronomy educators who will connect visitors with the cosmos through star parties and classes.

Training: We recruited a cohort of 12 astronomy educators by inviting volunteer naturalists and area teachers. All were experienced in educating young people and the public. The level of astronomy knowledge varied from experienced to “willing to learn.” Training included 12 hours of instruction at four evening classes in July and August 2013. Classes were divided between indoor instruction and outdoor instruction under the stars. Additional guided practice was provided at the public star parties. The evaluation below provides an overview of the topics covered as well as the progress made. We accomplished our goal of creating astroeducators comfortable in giving public and school programs. Comments on the evaluation also made clear the desire for additional training and practice.

We have supported the work of the astroeducators by creating a presentation that can be shared indoors before going outside for stargazing. “Becoming a Stargazer” covers our place in the cosmos, how to see the night sky, and what to see. We also created a 20-page Astroeducator Guide to serve as a ready reference. In April 2014 we provided training to 20 KVR volunteer naturalist

¹ This project was made possible through the generous support of a Wisconsin Space Grant Consortium Aerospace Outreach Award. We are also grateful for the telescope support provided by the Friends of the Kickapoo Reserve, LaCrosse Area Astronomical Society, Iowa County Astronomers, Starsplitters of Wyalusing, Madison Astronomical Society, and UW Space Place.

on using the Moon and Planet activities we created.

Astroeducator Evaluation			
On a scale of 1-5 with 1 = uncomfortable/“don't make me do this” and 5 = comfortable/“totally stoked” how prepared do you feel about doing the following with visitors to KVR?			
	Before Training	After Training	Change
Inspiring people with stories about the cosmos.	2.3	3.9	1.6
Explaining to people the basics of how telescopes work.	1.7	3.7	2.0
Using websites to see what sky conditions are going to be.	2.3	4.3	2.0
Using a planisphere to see what the sky will look like on given date and time.	1.7	4.6	2.9
Safely using a green laser pointer to show destinations in the sky.	2.7	3.2	0.5
Helping people to see at an eyepiece.	2.3	4.2	1.9
Setting up and using a go to telescope.	1.1	3.1	2.0
Setting up and using binoculars on a tripod.	2.6	4.6	2.0
Explaining night vision.	2.7	4.4	1.7
Discussing dark skies.	3.4	4.5	1.1
Explaining the basics about the moon.	2.9	4.3	1.4
Explaining the basics about planets.	2.7	4.4	1.7
Explaining about deep sky objects (binaries, clusters, nebulas, galaxies).	1.6	3.4	1.8
Identifying and talking about constellations and asterisms.	1.9	3.6	1.7
Talking about meteor showers and how to observe them.	2.9	4.3	1.4
Locating satellites in the sky.	2.7	3.6	0.9
Creating a public sky tour for a given date.	1.4	3.0	1.6
Using Starry Night Planetarium software to model the sky.	1.1	2.6	1.5
Giving an introductory stargazing presentation with power point.	1.4	3.7	2.3
Giving workshops for school groups.	1.7	3.6	1.9

Equipment: KVR already had two dozen binoculars and two spotting scopes which could be used for astronomy. A generous donor had given an 8-inch computerized Schmidt Cassegrain telescope. The Friends of the Kickapoo Valley Reserve supported our star parties by donating an 8-inch Dobsonian telescope with Telrad.

Through the Aerospace Outreach Award, we were able to purchase additional resources. Starry Night software (elementary and middle school) gave us the ability to model astronomical events indoors and offers an excellent daytime and cloudy night option for stargazing. Three laser pointers give astroeducators the means to help visitors locate planets, stars, and constellations. Ten

planispheres with red lights offer a simple means to find astronomical destinations and to discover how the sky changes through the day and the seasons. The Friends of KVR now offer these in the gift shop. A tripod with Paragon mount allows us to hold binoculars steady for viewing and to easily adjust the height for adults and children. We also have the beginning of an astronomical library. All of these purchases have proven to be good investments in our astronomy program.

Star Parties: Star parties are public events where visitors are invited to gaze through telescopes and to learn about the night sky. We were able to offer six star parties throughout the year and were fortunate to enjoy clear skies for all but one. Astroeducators shared the dark skies of KVR with over 150 visitors. With eyes alone and then with binoculars and telescopes, stargazers were able to see stars, planets, constellations, satellites, meteors, galaxies, and nebulas. We began three of the star parties with an indoor presentation. Two of the star parties included guest speakers. Our friends from La Crosse Area Astronomical Society were generous in setting up telescopes and sharing the view at two of the star parties. Judging by the many “wows” heard at the eyepieces and the questions asked and answered, our visitors were both inspired and educated.

Date	Attendance	Theme
12 Aug 2013	22	Perseids Meteor Shower
13 Sep 2013	65	Observing the Dark Sky LaCrosse Area Astronomical Society assisted with telescopes
2 Nov 2013	22	Autumn Skies/Comet ISON Guest Speaker: Dr. James Lattis, UW-Space Place LaCrosse Area Astronomical Society assisted with telescopes
11 Jan 2014	– cloudy	Kickapoo Valley Reserve Winter Festival Candlelight Hiking/Sking/Snowshoeing and Winter Astronomy at Wildcat Mountain State Park
22 Mar 2014	18	Falling in Love with the Night Sky Guest Speaker: Jean Napp, President Starsplitters of Wyalusing
3 May 2014	30	Voyage to the Planets Richland Center-Santa Teresa Sister City Project and Friends of the Kickapoo Valley Reserve Spring Fling

Classes: We created two curriculum units and taught eight classes to over 100 students.

Moon Phases allows students to observe and describe our Moon's appearance and how it changes shape over the course of a month.. Students discover for themselves how the shape of the Moon changes from day to day using direct observation and planetarium software. Students see how the Moon is made of lighter highlands, darker seas (maria), and many craters. Students learn how different cultures and people have seen different patterns on the Moon and create their own patterns.

Planet Walk lets students visualize the size of the many worlds orbiting our Sun and the immense distances between them. Most models and charts of our Solar System show the many worlds as

very close together. This lesson lets students experience a more accurate model of our Solar System. Students experience that most of our Solar System is empty space, the planets are relatively tiny, and the distances between them is immense. By taking a thousand-yard walk, students construct a scale model of our Solar System: the Kickapoo System. They learn about the many worlds of our Solar System and how they can be grouped into zones. They come to understand that science is not a static body of facts, but an evolving process subject to constant revision as improved technology provides better data.

An evaluation completed before and after the activity shows that students are good at identifying the many worlds in our solar system but underestimate their relative sizes and distances.

We also shared an astronomy class with our neighbors at Organic Valley.

Date	Class	Sections	Students
30 Oct 2013	Enjoying the Dark Skies CROPP Cooperative/Organic Valley Outreach	1	10
08 Nov 2013	Moon Magic	2	19
15 Nov 2013	Planet Walk	2	24
11 Mar 2014	Moon Magic	3	50

Conclusions:

We were fortunate to be able to recruit astroeducators from the pool of existing nature educators and to offer them stipends for their time. Our astroeducators would benefit from additional training especially in using Starry Night Software and giving public programs on their own.

Low tech is better for public programs. Our computerized telescope is a wonderful instrument but is difficult to align and fussy to use. Binoculars and Dobsonian telescopes are much easier to use and more child friendly. They are also the type of optical equipment we recommend to parents.

Having children complete evaluations is challenging. Having parents complete and return the evaluation online lowers the response rate. Having children complete the evaluation after the class takes away from class time.

A safe solar viewing curriculum unit would give us a valuable daytime option. A constellation unit would be a valuable addition.

Our public programs and classes have been successful in inspiring and educating young people. The next step is to increase their awareness of post secondary STEM education and careers.

The Kickapoo Valley Reserve provides a wonderful and amazing environment for astronomy education and stargazing. We look forward to growing the Driftless Dark Skies Initiative in the years ahead.