

	JOB TITLE	Astronomy Volunteer—South Rim		NEW
<b>JOB SAFETY ANALYSIS</b>	DEPARTMENT	GRCA Interpretation	X	REVISED
	ANALYSIS BY	Park Ranger Rader Lane	DATE	02/26/23
<b>REQUIRED AND/OR RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT</b>				
Warm clothes for cold temperatures and rain or hail, red and white lights for working with equipment in the dark. Water or warm beverage and a snack. NPS staff should carry a radio to communicate with one another and with Park Dispatch. NPS staff directing vehicle traffic must wear reflective vests at all times and use flashlights after dark.				
<b>SEQUENCE OF BASIC JOB STEPS</b>	<b>POTENTIAL HAZARDS</b>	<b>RECOMMENDED ACTION OR PROCEDURE</b>		
1. Set-up and take down of astronomy equipment	Lifting heavy equipment  Tripping with equipment	<ul style="list-style-type: none"> <li>• Take small loads or get someone else to help carry bulky items</li> <li>• Prop doors open or have someone hold them open.</li> <li>• Get a firm grip on equipment then lift with legs, not the back.</li> <li>• Have a headlamp or good flashlight to illuminate path.</li> </ul>		
2. Setting up for slide show	Electric cords  Crowd Control	<ul style="list-style-type: none"> <li>• Plan extension cord &amp; audio cord placement to avoid trip hazard.</li> <li>• Limit theater entrance to fire capacity of 233.</li> </ul>		
3. Weather considerations	Lightning	<ul style="list-style-type: none"> <li>• Use the 30/30 rule: Discontinue telescope viewing if flash-bang interval is less than 30 seconds and seek safety in vehicles or in buildings.</li> <li>• Do not return to telescopes until 30 minutes after the last flash.</li> <li>• Remember human safety comes before telescopes!</li> </ul>		
4. Telescope viewing	Pedestrian/vehicle conflict	<ul style="list-style-type: none"> <li>• Use traffic cones, sign and/or barricade to keep vehicles out of the telescope lot, except for astronomers dropping off or picking up telescopes. Astronomer vehicles should exit main telescope lot by 7 pm and generally return only after 11 pm (weather dependent).</li> <li>• When driving on telescope lot after dark, use extreme care or have someone walk in front. Use low lights but <b>DO USE ENOUGH LIGHTS TO SEE SAFELY</b>, regardless of astronomer protests.</li> <li>• The turn from the main road should be signed for “Astronomers and Commercial Buses Only.” The only authorized exceptions will be for reasonable accommodation of individuals with walking difficulties and no wheelchair, once driver is fully warned of pedestrian safety issues.</li> <li>• NPS staff working around vehicles will wear yellow safety vests.</li> </ul>		
	Tripping and falling	<ul style="list-style-type: none"> <li>• Give the public an etiquette talk at the slide show so they will know what to expect.</li> <li>• Have adequate spacing between the telescopes and mark the position of each telescope with dim red lights. Glow-in-the-dark tape is useful on tripod legs and eyepieces.</li> <li>• Use stable ladders as needed at each telescope for children and adults to steady themselves.</li> <li>• Avoid trip hazards, including in the placement of rope lights and power sources.</li> <li>• Rope off the video-scopes so as to allow screen views without danger of tripping over cords and equipment.</li> <li>• Encourage the use of flashlights when traveling to and from the telescope area. Use red rope lights to indicate the best approach to the telescopes and illuminate the pavement edge along the way.</li> <li>• Stay some distance away from the pavement edge and warn any visitors you see approaching it.</li> <li>• Curb between parking lots will be marked with glow-in-the-dark tape and kept free of any competing lights nearby. Likewise, the curb at the path leading around the theater.</li> </ul>		

		<ul style="list-style-type: none"> <li>• Watch for and do not allow visitors to lie down on the pavement in the dark.</li> </ul>
	Eye injury due to eyepiece	<ul style="list-style-type: none"> <li>• Use a red flashlight to illuminate eyepiece for each visitor. Glow-in-the-dark tape charged as needed with a UV flashlight is also helpful.</li> <li>• Give description of how to approach the telescope during etiquette talk.</li> </ul>
	Crowd control	<ul style="list-style-type: none"> <li>• Give the public an etiquette-talk at the slide show so those who attend will know what to expect.</li> <li>• Have adequate spacing between the telescopes and mark the position of each telescope with a red glow stick or red light. Use illuminated traffic cones to indicate general layout.</li> <li>• Control the lines at each telescope by having astronomer or their assistant direct people.</li> <li>• Use stable ladders as needed at each telescope for children and adults to steady themselves.</li> <li>• Have an adequate number of staff and astronomers available to direct crowd.</li> <li>• NPS staff will each carry a radio and will wear 2 red LED lights to be findable in the dark.</li> <li>• Cover telescopes not attended or not in use.</li> <li>• Dogs should be kept on a 4-foot leash and kept away from the telescopes.</li> <li>• No smoking or drinking alcoholic beverages.</li> <li>• Monitor behavior and call an LE Ranger to assist with disruptive individuals.</li> </ul>
5. Pointing green lasers	Blinding	<ul style="list-style-type: none"> <li>• Use only class I, II, or IIIa/3R lasers. Always use lowest level that's sufficiently visible to participants.</li> <li>• Never point at any person, animal, airplane, vehicle, building, or reflective object.</li> <li>• Avoid low angles close to the horizon.</li> <li>• Practice limited use of green lasers at star gazing events and give laser operator plenty of space for use.</li> <li>• Hold firmly. <i>Never let visitors handle lasers.</i></li> </ul>
6. COVID Mitigations	Contact with the Virus	<ul style="list-style-type: none"> <li>• Encourage social distancing in your telescope lines.</li> <li>• Wear a mask if you feel it necessary.</li> <li>• Avoid crowded indoor spaces.</li> <li>• If you show any symptoms, remove yourself from the event.</li> <li>• Periodically clean your lenses and focusers with an agent that kills the virus.</li> </ul>