

# SCHEDULE

## Girl Scout Leaders' Workshop in Hands-on Astronomy

in collaboration with the SETI Institute, Girl Scouts of Northern California,  
Girl Scouts of the United States of America, and The University of Arizona

**November 1 (Friday)**

*Welcome to Camp!*

Local Sidereal Time at midnight = 02:21:39

Theme: Orienting to the Sky

|          |   |                  |
|----------|---|------------------|
| 10:00 am | meet airline flights  |                  |
| 11:20 am | <i>Moonrise</i>   |                  |
| 12:00 pm | lunch   |                  |
| 1:30 pm  | leave for Biosphere 2   |                  |
|          | Pick up dinner  |                  |
| 3:00     | check-in at Biosphere<br>move into rooms  |                  |
| 3:30     | <b>overview of <i>Reaching for the Stars: NASA Science for Girl Scouts</i></b><br>this workshop: Goals and end-products;<br>language and attitudes; post-it notes   | (Larry)          |
| 4:00     | <b>Icebreaker: <i>What's in a Name?</i></b><br>safety orientation, notebooks<br>review potential badge themes for space science<br>dress for the evening outdoors   | (Larry)<br>(Don) |
| 5:00     | <b>dinner in Casita 1900</b>  |                  |
| 5:33     | <b>watch sunset</b><br>Discuss observing homework and motion and shape of Moon. Sketch time and position<br>of sunset and position and phase of Moon; record and predict<br>shadow of the Earth, "belt of Venus," five-day old Moon, (Mercury), Venus,<br>Jupiter, and Saturn<br>project our local models onto the sky (planisphere)<br>leaders help set up telescopes for the evening<br>binoculars, reflectors (including a Dobs) |                  |
| 5:58     | <i>end of civil twilight*</i>   |                  |
| 6:21     | <i>Mercury sets</i>   |                  |
| 6:27     | <i>end of nautical twilight*</i>  |                  |
| 6:30     | <b><i>Make your Own Planisphere</i></b>   | (All)            |
| 6:40     | <i>Venus sets</i>   |                  |
|          | *See handout in notebook  |                  |
| 6:56     | <i>end of astronomical twilight*</i>  |                  |

|         |   |                 |
|---------|---|-----------------|
| 7:15    | <b><i>Teaching Astronomy in and out of the Classroom</i></b><br>learn to use your planisphere<br>when will the Moon rise based on your prior observations?<br>where will Moon and planets be tomorrow?<br>sky story (Magpies Across the Milky Way)  | (Joe and Larry) |
| 8:00    | <b>Observing—dark adapt to music: “Phantom of the Opera”</b><br><b><i>Light-years and Lookback Time Discussion</i></b><br>naked eye, binoculars, telescopes<br>Challenges:<br>Earn your planisphere by locating five or six stars and five or six constellations.<br>Arcturus & Spica, Castor & Pollux, Polaris, Vega, Regulus, Procyon;<br>Gemini, Boötes, Hercules, Ursa Major, Ursa Minor, Draco, Leo, Lyra, Scorpius & Cygnus (later in evening)<br>Understand how telescopes work.<br>Why do objects move in the sky?<br>Kinesthetic models: nighttime sky: phases, rising/setting |                 |
| 8:12    | <i>Jupiter sets</i>   |                 |
| 9:00    | night snack<br>optional continuation of observing   |                 |
| 9:30 pm | <i>Moonset</i>  |                 |
| 9:49    | <i>Saturn sets</i>  |                 |
| 10:00   | sleep   |                 |
| 5:04 am | <i>Mars rises</i>   |                 |
| 5:18 am | <i>start of astronomical twilight*</i>  |                 |
| 5:47 am | <i>start of nautical twilight*</i>  |                 |
| 6:16 am | <i>start of civil twilight*</i>   |                 |
| 6:41 am | <i>sunrise</i>  |                 |

**November 2 (Saturday)**  
*Traveling Through Space and Time*

Local Sidereal Time at midnight = 02:25:36  
Theme: Scale Modeling our Neighborhood and Universe

|         |   |       |
|---------|---|-------|
| 5:00 am | Up early? Watch Mars and morning satellites. Observe with Larry, Joe, and Rita.   |       |
| 5:04 am | <i>Mars rise</i>  |       |
| 5:18 am | <i>start of astronomical twilight</i>   |       |
| 6:41    | <i>sunrise</i>  |       |
| 7:00    | breakfast   |       |
| 8:00    | <b><i>Thinking in 3-D: Phases</i></b><br><i>Activity:</i> Explore illumination of handheld balls<br>Do in small groups. | (Don) |

9:00 break & follow-up questions

9:15 ***Scale Modeling the Earth-Moon System*** (Larry)  
*Activity:* Scale models of the Earth-Moon system with clay.  
Do in small groups.  
**Clay Solar System (Display)**

9:45 break & follow-up questions

10:00 pm ***Scale Modeling: Our Solar System*** (Larry)  
*Activity:* Macramé model of the Solar System  
Clay model of the Solar System (Worlds in Comparison)

10:45 break & follow-up questions

11:00 ***Observing our Star: The Sun***

12:00 pm lunch  
make your own sandwich  
small groups to discuss specific topics from the morning's sessions

12:12 pm *Moonrise*

1:00 ***Classifying Solar System Objects*** (Larry)  
*Activity:* How would we classify these objects?  
[Include SS object and exoplanet classification, brings two activities/presentations together] (***Solar System and Beyond***)

1:45 break & follow-up questions

2:00 ***Viewing Our Origins: The Nature of Light*** (Don)  
*Demos:* Spectrum, IR video clips, brightness vs. distance

3:00 ***Group Discussion*** (Don and Joe)  
How would you use, and adapt, these activities in your Council?  
Address the morning's post-it questions. Local Astronomy Clubs

4:00 ***Biosphere 2 Tour*** (meet at the Lower Habitat)

5:32 **watch sunset?**  
Sketch time and position of sunset

5:58 *end of civil twilight\**

6:00 dress for the evening

6:15 dinner  
pizza and salad from Nonna Maria's Ristorante

6:17 *Mercury sets*

6:27 *end of nautical twilight\**

6:41 *Venus sets*

6:55 *end of astronomical twilight\**

7:15 observing:  
dark adapt to music: "**The Galaxy Song**"  
naked eye, binoculars, telescopes  
locate specific constellations, stars, planets, nebulae using your own planisphere  
Sketch time, position and phase of Moon; record and predict

|          |   |
|----------|---|
| 8:09     | <i>Jupiter sets</i>                               |
| 9:00     | night snack<br>optional continuation of observing |
| 9:45     | <i>Saturn sets</i>                                |
| 10:32 pm | <i>Moonset</i>                                    |
| 5:03 am  | <i>Mars rises</i>                                 |
| 5:19 am  | <i>start of astronomical twilight*</i>            |
| 5:47 am  | <i>start of nautical twilight*</i>                |
| 6:16 am  | <i>start of civil twilight*</i>                   |
| 6:42 am  | <i>sunrise</i>                                    |

**November 3 (Sunday)**  
*Our Solar System and Beyond*

Local Sidereal Time at midnight = 02:25:33  
Theme: Our Planetary and Stellar Neighborhood

|           |  |         |
|-----------|--|---------|
| 5:00 am   | Up early? Watch Mars and morning satellites. Observe with Larry, Joe, and Rita.  |         |
| 5:03 am   | <i>Mars rise</i>   |         |
| 5:19 am   | <i>start of astronomical twilight</i>  |         |
| 6:42 am   | <i>sunrise</i>   |         |
| 7:00–7:45 | brunch   |         |
| 8:00      | <b>Constellation Viewers</b><br><i>Activity:</i> Make Pringles Can Constellation viewers and show alternatives with other tubes/cylinders.   | (Larry) |
| 8:45      | break & follow-up questions  |         |
| 9:00      | <b>Classification: Galaxies</b><br><i>Activity:</i> Classification with galaxy flash cards   | (Don)   |
| 9:45      | break & follow-up questions  |         |
| 10:00     | <b>Classification: Stars</b><br><i>Activity:</i> Constellation cards<br>Discuss how stars are like people  | (Larry) |
| 10:45     | break and follow-up questions  |         |
| 11:00     | <b>Scale Modeling: Exoplanet Systems</b><br><i>Activity:</i> Give each group an exoplanet system to scale model<br>break and follow-up questions (could replace Nearest and Brightest) | (Don)   |
| 11:45     | break and follow-up questions  |         |
| 12:00 pm  | lunch  |         |
| 12:58 pm  | <i>Moonrise</i>  |         |
| 1:00      | clean and move out of casitas  |         |

pack and load luggage and gear  
keep out warm clothes for very cool evening on Mt. Bigelow

- 1:30      **Exploring Unknown Worlds**      (Larry)  
Activity:      Observe an unknown world by various techniques
- 2:30      **Group Discussion**      (All)  
How would you use, and adapt, these activities for your troops?  
“Swap” exchange
- 3:00      **Evaluations and group pictures.**  
Fill out survey forms
- 3:30      Depart for Mt. Bigelow
- 4:30      order dinners at Subway en route to Mt. Bigelow
- 5:31      *sunset*
- 5:57      *end of civil twilight\**
- 6:13      *Mercury sets*
- 6:26      *end of nautical twilight\**
- 6:30      **observe with the 61" telescope**
- 6:55      *end of astronomical twilight\**
- Evening      **Meteorites and Small Telescope**      (Larry and Joe)  
Activity:      What are meteorites and where do they come from  
This can be done at the 61" as others are observing.
- 6:41      *Venus sets*
- 8:06      *Jupiter sets*
- 9:42      *Saturn sets*
- 10:00      Leave for La Quinta
- 11:28 pm      *Moonset*

**Displayed Activities**

**Big Eyes \*\***

**Constellation Transformation \*\***

**Clay Solar System \*\***

**Density**

**Nearest and Brightest**

**\*See What is Twilight handout**

**\*\*Badge activity**

