

SCHEDULE

BEGINNING ASTRONOMY CAMP

June 4-11, 2005

Commemorating the 100th year of Einstein's Most Creative Year:

"We cannot solve problems with the same level of thinking we used when we created them."

Albert Einstein

JUNE 4 (Saturday)

Welcome to Camp!

Sidereal time at midnight: 16:31:41

**"Imagination is more important than knowledge."
(Einstein)**

| | | |
|-------|---|---------------|
| 9-3 | Airplane arrivals; students phone home | |
| 3-4 | Meet in conference room at Sheraton Four Points Hotel look at your notebook; take the fun science "quiz" | |
| 3:30 | "Mt. Lemmon: A Sky Island" | (Don) |
| 4 | Drive to Mt. Lemmon last bathroom and water stop for next 1.5 hours | |
| 5:30 | Move into dorm rooms dress warmly for the night | |
| 6:30 | Dinner: BBQ cookout | |
| 7:25 | Watch the sunset see the 'green flash', Earth's shadow, first stars, Venus, Jupiter | |
| 7:45 | Orientation in the gymnasium icebreakers & recreation rules & safety computer policies | (Don & staff) |
| 8:45 | Iridium satellite flash (V=-8; azimuth = 81 deg., altitude = 52 deg.) | |
| 9 | "Einstein at the Science Fair" dark adaption to "Where My Heart Will Take Me" night sky orientation at the 60" telescope Right Ascension, Declination, Sidereal Time | (at the 60") |
| 9:03 | End of astronomical twilight | |
| 9:15 | Observe with binoculars & the 4", 10", 40", and 60" telescopes check out Jupiter, Mizar/Alcor, and M13 planispheres start the 'constellation contest' | |
| 10:10 | Iridium satellite flash (V=-7; azimuth = 56 deg., altitude = 18 deg.) | |
| 11 | Sleep | |
| 2 AM | Great Red Spot rises on Jupiter | |
| 3:40 | Start of astronomical twilight | |
| 4:09 | Moonrise | |

JUNE 5 (Sunday)

"Seeing" the Universe Around Us

Sidereal time at midnight: 16:35:38

**"Anyone who has never made a mistake has never tried anything new."
(Einstein)**

| | | |
|----------|--|----------------|
| 5:18 AM | Sunrise | |
| 9 | Wakeup; breakfast in the Minnesota building | |
| 9:30 | Meet in the gymnasium: handout notebooks & T-shirts overview of week's schedule mountain safety projects for research teams | |
| 10:30 | Walking tour of the mountain summit & telescopes | |
| 11:30 | "Telescope Making Project" | (in gym; Jeff) |
| 12:30 | Lunch video & informal discussion: "Cosmic Voyage" | |
| 2 | "Light is Everywhere but Not at the Same Time" experimenting with infrared light | (Don & Jeff) |
| 3 | Students experiment with light at four stations (20 min. each): refraction (Paul & Nicole) interference, diffraction (Jeff & Wayne) reflection (Sarah & Katie) inverse-square 'law' (Don & Shelley) | |
| 4:45 | "Newton's Laws: Build a Newton's Car" competition between research teams | |
| 6:15 | Dinner video: "Powers of Time" dress for an evening of observing | |
| 7:26 | Watch sunset at the 60" telescope open telescope early to see Saturn as soon as possible | |
| 7:40 | "Einstein's Gedanken Experiments" dark adaption to "Music of the Night" | (at the 60") |
| 8 | Observing in research teams (rotate every hour) 40" telescope (Don, Paul, Nicole) also naked eye, binoculars, 10" telescope stars as "standard candles" CCD imaging at 12" telescope (Sarah & Shelley) 60" telescope (Katie, Jeff, Wayne) | |
| 8:39 | Iridium satellite flash (V=-1; azimuth = 82 deg., altitude = 52 deg.) | |
| 9:04 | End of astronomical twilight | |
| 10:04 | Iridium satellite flash (V=0; azimuth = 57 deg., altitude = 18 deg.) | |
| 11:20 | Great Red Spot transits on Jupiter | |
| 12:00 AM | Midnight snack | |
| 0:15 | Sleep | |
| 3:40 | Start of astronomical twilight | |

4:50 Moonrise

JUNE 6 (Monday)
Navigating the Solar System

Sidereal time at midnight: 16:39:34
New Moon

**"The important thing is not to stop questioning. Curiosity has its own reason for existing."
(Einstein)**

| | | |
|----------|---|------------------|
| 5:18 AM | Sunrise | |
| 10 | Wakeup; breakfast in the Minnesota building | |
| 10:30 | "What is a Scale Model?" | (in gym; Katie) |
| | build a scale model Earth-Moon system | |
| | understand and practice "phases" of the Moon | |
| 12:30 PM | Lunch | |
| | video: "Science & Space" | |
| | President Kennedy's 1962 "Moon speech" | |
| 1:15 | "Lunar Stratigraphy: The Superposition Principle" | (Jeff & Nicole) |
| | build 'stratigraphic' sheets to stump other teams | |
| | study Consolidated Lunar Atlas to find the oldest possible surface | |
| 2:15 | "The Great Solar System Explorer" | |
| | hike the Solar System to scale (outdoors) | |
| 4:30 | "Saturn is Sooo Cold" | (Don) |
| | liquid nitrogen demonstrations | |
| 5:30 | Research teams plan observing program for the night | |
| 5:45 | Dress for the evening | |
| 6 | Dinner | |
| | video: "Wide Eyes" about the University's Mirror Lab | |
| 7:15 | Great Red Spot transits on Jupiter | |
| 7:26 | Watch sunset at the 60" telescope | |
| 7:40 | "Einstein and Relativity" | (at 60") |
| | dark adaption to "Planet X" | |
| 7:45 | Moonset | |
| 8 | Observing in research teams (rotate every hour) | |
| | 40" telescope | (Don & Shelley) |
| | also naked eye, binoculars, 10" telescope | |
| | CCD imaging at 12" telescope | (Sarah & Wayne) |
| | 60" telescope | (Katie & Nicole) |
| | Telescope building project at radome | (Jeff & Paul) |
| 9:01 | End of astronomical twilight | |
| 10:08 | Iridium satellite flash (V=-2; azimuth = 60 deg., altitude = 23 deg.) | |
| 12:00 AM | Snack | |
| 1 | Sleep | |
| 3:39 | End of astronomical twilight | |

JUNE 7 (Tuesday)

The Sun is a Mass of Incandescent Gas

Sidereal time at midnight: 16:43:31

**"The most beautiful thing we can experience is the mysterious."
(Einstein)**

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|---------|---|-------------------|
| 5:18 AM | Sunrise | |
| noon | Wakeup; brunch in Minnesota building | |
| 1 | "What is a Star?" | (in gym; Don) |
| | music selections: <i>Space Songs, The Beatles, They Might be Giants</i> | |
| 1:30 | Observe the Sun in four group rotations | |
| | chart the positions of sunspots: | |
| | eyepiece projection (near the 40") | (Jeff & Wayne) |
| | SunGun, Questar (near the 60") | (Sarah & Nicole) |
| | prominences in H-alpha (at the 12") | (Katie & Shelley) |
| | solar activity via Internet (at the 40/60") | |
| | measure the Sun's luminosity (near the 12") | (Don & Paul) |
| 2:45 | "What is a Spectrum?" | (in gym; Jeff) |
| | build a spectrometer and examine light sources | |
| 4:30 | Research teams plan observing program for the night | |
| 5 | "Stars Have Lives, Too!" | (Don) |
| 5:45 | Dress for the evening | |
| 6 | Dinner | |
| | video: "Bart Discovers a Comet" | |
| | a pinhole camera: See the Sun indoors | |
| | liquid nitrogen ice cream | |
| 7:27 | Watch sunset at 60" telescope | |
| | Moon, Mercury, & Venus are close together | |
| 7:40 | "Einstein, Atoms, & Stars" | (at 60"; Don) |
| | dark adaption to "The Galaxy Song" | |
| 8 | Observing in research teams (rotate every hour; three stations only) | |
| | 40" telescope | (Don & Wayne) |
| | also naked eye, binoculars, 10" telescope | |
| | CCD imaging at 12" telescope | (Sarah & Paul) |
| | 60" telescope | (Katie & Shelley) |
| | Telescope building project | (Jeff & Nicole) |
| 8:41 | Moonset | |
| 9:05 | End of astronomical twilight | |
| 10:02 | Iridium satellite flash (V=-4; azimuth = 61 deg., altitude = 23 deg.) | |
| 11:00 | Light snack; sleep | |
| 1 AM | Great Red Spot transits Jupiter | |
| 3:39 | Start of astronomical twilight | |

JUNE 8 (Wednesday)

Galaxies, Sky Islands

Sidereal time at midnight: 16:47:28

Venus 4° south of Moon

**"The whole of science is nothing more than a refinement of everyday thinking."
(Einstein)**

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|----------|---|
| 5:18 AM | Sunrise |
| 7 | Wakeup; put on sunscreen! Breakfast in Minnesota building |
| 8 | Leave for Kitt Peak |
| 11 | Picnic lunch at Kitt Peak National Observatory |
| noon | Visitors' Center exhibits/gift shop |
| 1 | Tour these facilities: McMath-Pierce solar telescope, Mayall 3.8 meter telescope |
| 4 | Leave for Tucson |
| 5:30 | Dinner at Zachary's Pizza |
| 7 | Tour the Mirror Lab CLOSED TOED SHOES ONLY |
| 7:28 | Sunset |
| 8 | Leave for Mt. Lemmon |
| 9 | Great Red Spot transits Jupiter |
| 9:06 | End of astronomical twilight |
| 9:32 | Moonset |
| 9:35 | Arrive at summit dress warmly for the night |
| 10:15 | Meet at the 60" dark adaption to " <i>Halley Came to Jackson</i> " |
| 10:30 | Observing in research teams (rotate every 45 minutes) 40" telescope (Wayne & Nicole) also naked eye, binoculars, 10" telescope CCD imaging at 12" telescope (Katie & Don) 60" telescope (Sarah & Paul) Telescope building project (Jeff & Shelley) |
| 12:00 AM | Snack |
| 2 | Sleep |
| 3:39 | Start of astronomical twilight |
| 3 | Sleep |

JUNE 9 (Thursday)

Way Up There and Way Back Then

Sidereal time at midnight: 16:51:24

Saturn 5° south of Moon

Double Shadows of Moons on Jupiter Tonight

**"Everything should be made as simple as possible, but not simpler."
(Einstein)**

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|----------|--|--|-------|
| 5:17 AM | Sunrise | | |
| 12 PM | Wakeup; brunch in the Minnesota building | | |
| 1 | "Stellar Parallaxes" | (Don, Katie, Sarah) | |
| | measure distances to radio towers | | |
| 2:30 | Liquid nitrogen CANNON(!) activity | | |
| 3 | Free time | | |
| 1 | 4 | "Galaxies: Billions and Billions" | (Don) |
| | | classification activity | |
| 5 | Research teams plan observing program for last full night | | |
| 6 | Dinner | | |
| | video: "The Dish" or "October Sky" | | |
| 7:28 | Sunset | | |
| 7:40 | "Einstein's Quotes: Your Reactions" | | |
| | dark adaption to "Way Up There" | | |
| 8 | Observing in research teams (rotate every hour) | | |
| | 40" telescope | (Paul & Don) | |
| | also naked eye, binoculars, 10" telescope | | |
| | CCD imaging at 12" telescope | (Katie & Nicole) | |
| | 60" telescope | (Sarah & Shelley) | |
| | Telescope building project | (Jeff & Wayne) | |
| 8:24 | Iridium satellite flash (V=0; azimuth =84 deg., altitude = 63 deg.) | | |
| 9:07 | End of astronomical twilight | | |
| 9:59 | Iridium satellite flash (V=-1; azimuth =63 deg., altitude = 29 deg.) | | |
| 10 | Io & Europa in front of Jupiter | | |
| 10:16 | Moonset | | |
| midnight | Snack | | |
| | shadows of Io & Europa cast on Jupiter | | |
| 1 AM | Great Red Spot rises on Jupiter | | |
| 3:39 | Start of astronomical twilight | | |

JUNE 10 (Friday)

"Starlight Nights"

Sidereal time at midnight: 16:55:21

**"Any intelligent fool can make things bigger, more complex, and more violent.
It takes a touch of genius -- and a lot of courage -- to move in the opposite direction."
(Einstein)**

| | | |
|---------|---|---------------------------|
| 5:17 AM | Sunrise | |
| 12 PM | Wakeup; brunch in the Minnesota building | |
| 1 | "Einstein and the Expanding Universe" | (Don & Shelley) |
| | measure a "Hubble Constant" | |
| 2:30 | EVERYONE pack luggage and CLEAN your rooms!! | |
| | clean & vacuum rooms!! | |
| | scholarship students write thank-you letters | |
| | show Don your airline ticket | |
| 3:30 | Project presentations | |
| 5:15 | Dress for the evening | |
| 5:30 | Dinner | |
| 6:30 | Leave for Mt. Bigelow & the 61" Kuiper telescope | |
| 7:20 | Great Red Spot rises on Jupiter | |
| 7:30 | Sunset | |
| 7:30 | "A Nighttime Tour of the Stars" | (at 61" Kuiper telescope) |
| | (David Levy; Dean Koenig) | |
| 7:28 | Sunset | |
| 8 | Observing at Mt. Bigelow: | |
| | visual imaging/photography at the 61" | |
| | wide-field CCD imaging | |
| 11 | Drive to Mt. Lemmon | |
| 11:30 | Sleep | |

JUNE 11 (Saturday)

New Perspectives: The Universe

Sidereal time at midnight: 16:59:17

Moon at apogee

**"I have no special talents. I am only passionately curious."
(Einstein)**

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|---------|--|-----------------------------------|
| 5:18 AM | Sunrise | |
| 7:00 | Wakeup; breakfast in dorms | |
| | FINISH CLEANING & PACKING UP EVERYTHING!!! | |
| | You must have a counselor check you out of your room. | |
| 9:00 | <u>MUST</u> leave for Tucson | |
| ** 11 | Graduation ceremony | (UA Foundation Building room 205) |
| 12 PM | Leave for homes | |

** Graduation is open to all families. It will begin at approximately 11-11:30 AM at The University of Arizona Foundation Building at 1111 N. Cherry Ave.