

Name:
Partner(s), if applicable:

ASTR110L

6 - Planetarium

Purpose: To experience the motion of the Sun and the night sky at different times and different locations on Earth. Answer the questions in the spaces provided.

Due: at the end of class time.

Materials:

Red headlamp
Laser pointers
Clipboard

Calculator
Non-red writing utensil

During the planetarium show, we'll be only using constellations from this check list.

- | | | |
|--------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> Cassiopeia | <input type="checkbox"/> Gemini | <input type="checkbox"/> Scorpio |
| <input type="checkbox"/> Taurus | <input type="checkbox"/> Leo | <input type="checkbox"/> Sagittarius |
| <input type="checkbox"/> Orion | <input type="checkbox"/> Ursa Major (Big Dipper) | <input type="checkbox"/> Cygnus |
| <input type="checkbox"/> Canis Major | <input type="checkbox"/> Crux (Southern Cross) | <input type="checkbox"/> Pegasus |

Interactive Planetarium Show:

Location on Earth—Hilo: We will start at the planetarium while located in Hilo and we will travel in time to different dates.

Q0) Today's date: _____

Q1) In what cardinal direction did the Sun rise? Be specific. _____

Q2) Record the time of sunrise and sunset: _____/_____

Q3) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q4) In what cardinal direction did the Sun set? Be specific. _____

Q5) How many hours of daylight are there today? Be accurate. _____

- Spring or Vernal Equinox: March 20

Q6) In what cardinal direction did the Sun rise? Be specific. _____

Q7) Record the time of sunrise and sunset: _____/_____

Q8) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q9) In what cardinal direction did the Sun set? Be specific. _____

Q10) How many hours of daylight are there on March 20? _____

Q11) Describe the location of Orion in the sky just after sunset.

Q12) What constellation(s) is/are high in the southern sky at 9 PM?

<input type="checkbox"/> Cassiopeia	<input type="checkbox"/> Gemini	<input type="checkbox"/> Scorpio
<input type="checkbox"/> Taurus	<input type="checkbox"/> Leo	<input type="checkbox"/> Sagittarius
<input type="checkbox"/> Orion	<input type="checkbox"/> Ursa Major (Big Dipper)	<input type="checkbox"/> Cygnus
<input type="checkbox"/> Canis Major	<input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Pegasus

- Summer Solstice: June 20

Q13) In what cardinal direction did the Sun rise? Be specific. _____

Q14) Record the time of sunrise and sunset: _____/_____

Q15) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q16) In what cardinal direction did the Sun set? Be specific. _____

Q17) How many hours of daylight are there on June 22? _____

Q18) What constellations are visible in the western sky just after sunset?

<input type="checkbox"/> Cassiopeia	<input type="checkbox"/> Gemini	<input type="checkbox"/> Scorpio
<input type="checkbox"/> Taurus	<input type="checkbox"/> Leo	<input type="checkbox"/> Sagittarius
<input type="checkbox"/> Orion	<input type="checkbox"/> Ursa Major (Big Dipper)	<input type="checkbox"/> Cygnus
<input type="checkbox"/> Canis Major	<input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Pegasus

Q19) What patterns of stars are close to zenith at 2 AM?

<input type="checkbox"/> Cassiopeia	<input type="checkbox"/> Gemini	<input type="checkbox"/> Scorpio
<input type="checkbox"/> Taurus	<input type="checkbox"/> Leo	<input type="checkbox"/> Sagittarius
<input type="checkbox"/> Orion	<input type="checkbox"/> Ursa Major (Big Dipper)	<input type="checkbox"/> Cygnus
<input type="checkbox"/> Canis Major	<input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Pegasus

- Lahaina “Noon:” May 18

Q20) In what cardinal direction did the Sun rise? Be specific. _____

Q21) Record the time of sunrise and sunset: _____/_____

Q22) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q23) In what cardinal direction did the Sun set? Be specific. _____

Q24) How many hours of daylight are there on May 18? _____

- Lahaina “Noon:” July 24

Q25) In what cardinal direction did the Sun rise? Be specific. _____

Q26) Record the time of sunrise and sunset: _____/_____

Q27) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q28) In what cardinal direction did the Sun set? Be specific. _____

Q29) How many hours of daylight are there on July 24? _____

- Autumn Equinox: September 22

Q30) In what cardinal direction did the Sun rise? Be specific. _____

Q31) Record the time of sunrise and sunset: _____/_____

Q32) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q33) In what cardinal direction did the Sun set? Be specific. _____

Q34) How many hours of daylight are there on Sep. 21? _____

Q35) What constellations are visible in the southern sky just after sunset?

- | | | |
|--------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> Cassiopeia | <input type="checkbox"/> Gemini | <input type="checkbox"/> Scorpio |
| <input type="checkbox"/> Taurus | <input type="checkbox"/> Leo | <input type="checkbox"/> Sagittarius |
| <input type="checkbox"/> Orion | <input type="checkbox"/> Ursa Major (Big Dipper) | <input type="checkbox"/> Cygnus |
| <input type="checkbox"/> Canis Major | <input type="checkbox"/> Crux (Southern Cross) | <input type="checkbox"/> Pegasus |

Q36) What is the location of Cygnus in the sky just after sunset? Be specific.

- Winter Solstice: December 21

Q37) In what cardinal direction did the Sun rise? Be specific. _____

Q38) Record the time of sunrise and sunset: _____/_____

Q39) Where is the Sun at midday (crossing the meridian)? Be specific. _____

Q40) In what cardinal direction did the Sun set? Be specific. _____

Q41) How many hours of daylight are there on Dec. 21? _____

Q42) What constellations will be rising from the east just after sunset?

- | | | |
|--------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> Cassiopeia | <input type="checkbox"/> Gemini | <input type="checkbox"/> Scorpio |
| <input type="checkbox"/> Taurus | <input type="checkbox"/> Leo | <input type="checkbox"/> Sagittarius |
| <input type="checkbox"/> Orion | <input type="checkbox"/> Ursa Major (Big Dipper) | <input type="checkbox"/> Cygnus |
| <input type="checkbox"/> Canis Major | <input type="checkbox"/> Crux (Southern Cross) | <input type="checkbox"/> Pegasus |

Q43) What constellations will just be setting in the northwest about 9 PM?

- | | | |
|--------------------------------------|--|--------------------------------------|
| <input type="checkbox"/> Cassiopeia | <input type="checkbox"/> Gemini | <input type="checkbox"/> Scorpio |
| <input type="checkbox"/> Taurus | <input type="checkbox"/> Leo | <input type="checkbox"/> Sagittarius |
| <input type="checkbox"/> Orion | <input type="checkbox"/> Ursa Major (Big Dipper) | <input type="checkbox"/> Cygnus |
| <input type="checkbox"/> Canis Major | <input type="checkbox"/> Crux (Southern Cross) | <input type="checkbox"/> Pegasus |

Putting it all together:

Q44) Does the Sun always rise exactly from the east? _____

Q45) List the direction of sunrise at the beginning of each season (be specific):

Summer:	Winter:
Autumn:	Spring:

Q46) List the direction of sunset at the beginning of each season (be specific):

Summer:	Winter:
Autumn:	Spring:

Q47) Fill out the following table using the numbers in previous questions:

	Summer Solstice:	Autumnal Equinox:	Winter Solstice	Spring Equinox
Hours of daylight				

Q48) How did the number of daylight hours change from:

Summer Solstice to Autumnal Equinox: _____

Autumnal Equinox to Winter Solstice: _____

Winter Solstice to Spring Equinox: _____

Spring Equinox to Summer Solstice: _____

Q49) Describe the changes in the midday (on meridian) position of the Sun from:

Summer Solstice to Autumnal Equinox: _____

Autumnal Equinox to Winter Solstice: _____

Winter Solstice to Spring Equinox: _____

Spring Equinox to Summer Solstice: _____

Q50) Was the Sun ever directly overhead at midday in Hilo? If so, when? Why then?

Q51) Describe the location in the sky of the constellation Orion at sunset for the beginning of each season (be specific):

Summer Solstice: _____

Autumnal Equinox: _____

Winter Solstice: _____

Spring/Vernal Equinox: _____

Q52) Check the names of the constellations that you can see during the night as shown on the planetarium:

Hilo LAT: 19°N	Summer Solstice Jun. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Hilo LAT: 19°N	Autumnal Equinox Sep. 22	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Hilo LAT: 19°N	Winter Solstice Dec. 21	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Hilo LAT: 19°N	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
San Francisco, California LAT: 40°N	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
North Pole LAT: 90°N	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Atlanta, Georgia LAT: 33°N	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Quito, Ecuador LAT: 0°N	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus
Santiago, Chile LAT: 33°S	Spring Equinox Mar. 20	<input type="checkbox"/> Cassiopeia <input type="checkbox"/> Taurus <input type="checkbox"/> Orion <input type="checkbox"/> Canis Major	<input type="checkbox"/> Gemini <input type="checkbox"/> Leo <input type="checkbox"/> Ursa Major (Big Dipper) <input type="checkbox"/> Crux (Southern Cross)	<input type="checkbox"/> Scorpio <input type="checkbox"/> Sagittarius <input type="checkbox"/> Cygnus <input type="checkbox"/> Pegasus