Name \_\_\_\_ Date \_\_\_\_

1. Click on the <https://www.earthspacelab.com/app/eclipse/>

or use <http://somup.com/cZ6ZqKHHdX> (7:50) Solar & Lunar Eclipses

a. Look to the right of the screen. Make sure that the following boxes are checked:

* The Moon’s orbit around the Earth
* Rotation of the Earth
* Eclipse – view from the Earth



b. Observe the animation, allowing the moon to completely revolve around the Earth.

c. During what moon phase can a solar eclipse occur? *\_\_\_\_*

d. During what moon phase can a lunar eclipse occur? *\_\_\_\_*

e. Write the names of the “Shadows” around the Earth in the text boxes of the diagram:



f. As you adjust the placement of the Sun, notice the alignment of the moon, Earth and Sun especially during potential eclipses.

g. Why don’t all new and full Moons produce eclipses?

*Name the moon phases based on the diagram:*



1.

2.

3.

4.

5.

6.

7.

8.

*Crescent (waxing / waning), gibbous (waxing / waning), new moon, full moon, 1st & 3rd qtr moon*

2. Download the “**SkyView Lite**” cell phone app (Free) for constellations.

a. Open the SkyView Lite app.

b. Click on the menu icon (3 parallel lines in the upper corner).

c. Click on “Tool” icon (wrench icon).

d. Click on location (arrowhead icon) and record latitude and longitude:

latitude 🡪

longitude 🡪

e. Click “Done” to return to the app.

f. Point the phone in various directions (up, down, left, right, etc.).

g. List the MAJOR constellations that you can observe using the app.



Ursa Major (big bear)

Ursa Minor (little bear)

Cassiopeia

Cygnus (swan)

Andromeda (princess)

Pegasus (horse)

Perseus (queen)

Canis Minor (dog)

Serpens (snake)

Monoceros (unicorn)

Draco (dragon)

Aquila (eagle)

Orion (hunter)

Polaris (north star)

1. 7.

2. 8.

3. 9.

4. 10.

5. 11.

6. 12.

g. List the planets that you can observe using the app.

1. 4.

2. 5.

3. 6.

3. Click on the link below and watch the video, answering the questions.

<http://somup.com/cZ6TrOHdRP> Red Shift (3:10)

a. What does red shift imply about the universe?

b. What phenomenon is similar to red shift? Explain what it is.

c. Describe the frequencies produced by red and blue light.

d. When atomic spectra of far-away stars and the sun were compared, what conclusion could be made?

e. What were Hubble’s conclusions related to galaxies next to our own and the universe?



ANSWERS

c. During what moon phase can a solar eclipse occur? ***NEW MOON***

d. During what moon phase can a lunar eclipse occur? ***FULL MOON***



penumbra

umbra

g. Why don’t all new and full Moons produce eclipses?

A new Moon occurs whenever the Moon is merely on the same side of the Earth as the Sun, but it may or may not be on a level with the Sun. In that case, you would not have a solar eclipse. If, however, the Moon happened to be in the middle of its up-and-down travel at the same time that it crossed the Sun's side of the Earth, then you could get an eclipse if the alignment were precise enough.

Basically, a New Moon is when the Sun and Moon are vaguely in the same direction, while an eclipse occurs when they are in *almost exactly* the same direction. For a total eclipse, the alignment has to be nearly perfect.

The Lunar eclipse will occur when the moon is directly opposite the Earth, and the Sun is positioned directly on the *other* side of the Earth, while presenting itself as a Full Moon.

*Moon Phases:*



1. New moon

2. waxing crescent

3. first quarter

4. waxing gibbous

5. full moon

6. waning gibbous

7. third quarter

8. waning crescent

3. Click on the link below and watch the video, answering the questions.

<http://somup.com/cZ6TrOHdRP> Red Shift (3:10)

a. What does red shift imply about the universe?

***Red shift implies that the universe is expanding. This makes sense since God is infinite.***

b. What phenomenon is similar to red shift? Explain what it is.

***The doppler effect occurs when objects are moving towards another object (causing higher frequencies) or moving away from another object (causing lower frequencies of sound or waves).***

c. Describe the frequencies produced by red and blue light.

***Red light has lower frequency than blue light.***

d. When atomic spectra of far-away stars and the sun were compared, what conclusion could be made?

***The atomic spectra were identical except the far away star had shifted.***

e. What were Hubble’s conclusions related to galaxies next to our own and the universe?

***Most galaxies are moving away from our own. The further away they are, the faster they move, showing that the universe is expanding.***

