Objectives:

1. Use the Star & Planet Locator (the “Star Guide”) to find circumpolar constellations.
2. Identify the circumpolar constellations, and understand their orientation in the sky over the year.
3. Learn about asterisms and the pointers.
4. Identify the brightest stars in each constellation.
5. Learn the position of a constellation on a star chart and in the real sky.

Materials Needed:

A Planisphere (Star & Planet Locator) and its accompanying instructional booklet

Procedure:

1. Set your Star Guide to 9:00 PM on January 15. If you have not used your Star Guide yet, setting it is easy! Rotate the date on the moveable calendar ring so that it is next to the time — printed like a clock — on the inner edge of the locator.

   Please be sure that you put the date next to the correct time, in this case 9 PM, and not 9 AM.

   Examine the Star Guide, and identify the circumpolar constellations that are found around the North Star, Polaris, which is located at the center of the locator (where the grommet holds the moveable wheel to the sleeve.)

2. In this activity, we will want to view the northern part of the sky, near Polaris. Hold your Star Guide so that the “North” corner is pointing down, as shown:

   The Star Guide is now positioned as though you were looking due North. Note that the location of Polaris, at the center of the wheel, is not shown, but the rest of URSA MINOR is visible nearby. Locate the other circumpolar constellations of URSA MAJOR, CASSIOPEIA, CEPHEUS, & DRACO.
3. In the first diagram labeled JANUARY on the following page, note the pattern of stars. Locate and identify the circumpolar constellations. You might start with URSA MAJOR’s brightest stars, which we see as the Big Dipper, or CASSIOPEIA; both have shapes that are fairly easy to spot.

- **Draw lines** connecting the bright stars of each of the circumpolar constellations listed.
- **Label those constellations with their proper names.** This is what the northern sky looks like in Winter around 9 PM.

4. How does the northern sky look in Spring at 9 PM? How do these circumpolar constellations change? Slowly rotate your Star Guide calendar ring until it shows the sky for 9:00 PM on April 15. Notice how the circumpolar constellations stay visible over the northern horizon, but are now seen in slightly different positions.

- In the next diagram labeled APRIL again **draw lines** connecting the bright stars of each of the circumpolar constellations listed.
- **Label the constellations using their common names or asterisms listed:** The Big Dipper, The Little Dipper, The Queen, The King, and The Dragon.

5. Now that you have the circumpolar constellations and their common names appropriately labeled for the winter and spring positions, rotate your Star Guide ring until it shows the sky for 9:00 PM on July 15; let’s see what the constellations look like in summer.

- On the diagram labeled JULY again **draw lines** connecting the bright stars of each of the circumpolar constellations listed.
- **Label only the bright stars within each constellation.** DO NOT LABEL NAMES OF CONSTELLATIONS. Note that the constellations appear to rotate about 90 degrees from season to season.

6. Change the date and time on your Star Guide to 9:00 PM on October 15. Draw lines connecting the bright stars of each constellation on the star map labeled OCTOBER. This star map indicates the position of the circumpolar constellations as seen during the autumn.

- Show how the two stars of the Big Dipper’s cup (named Merak, at the bottom of the cup, and Dubhe at the top) can be used to point to Polaris. Your star guide will help you with this step.
- Secondly, show how a line drawn from Mizar, in the Big Dipper, through Polaris enables one to find the constellation Cassiopeia.

7. **Go outside this week, and set your Star Guide to the correct date and time.** Face due north, and try to identify the circumpolar constellations you can see!

8. **Turn in a sketch, with your name, date, and the time of observation.** Include on your diagram the horizon, and estimate how high you see the circumpolar constellations using your hand held at arm’s length as a rough measuring device (about 20 degrees wide, from thumb to little finger!) Turn in this sketch along with the Circumpolar Constellation seasonal star maps (page 6). Please put your name, date, and names of your lab partners at the top of the sheet.