# Visualizing the Night Sky – Worksheet

**Kids' Passport 2021 - Astronomy & Astrophysics**

## Skygazing 101

Access Stellarium at https://stellarium-web.org/
Remember to…

- Set your location
- Set the time
- Familiarize yourself with the search field and constellation button

1. In Stellarium, without the constellation lines turned on, try to find the Big Dipper. Use it to try to find the North Star (also known as Polaris).
   ★ If you are in a dark location, try this on a clear night with the real night sky!

2. In Stellarium, locate the sun and trace out an imaginary path across the sky. This is the Ecliptic! Notice that the Moon and planets also follow this path. What direction is this line in the Norther Hemisphere (e.g. in Toronto)?

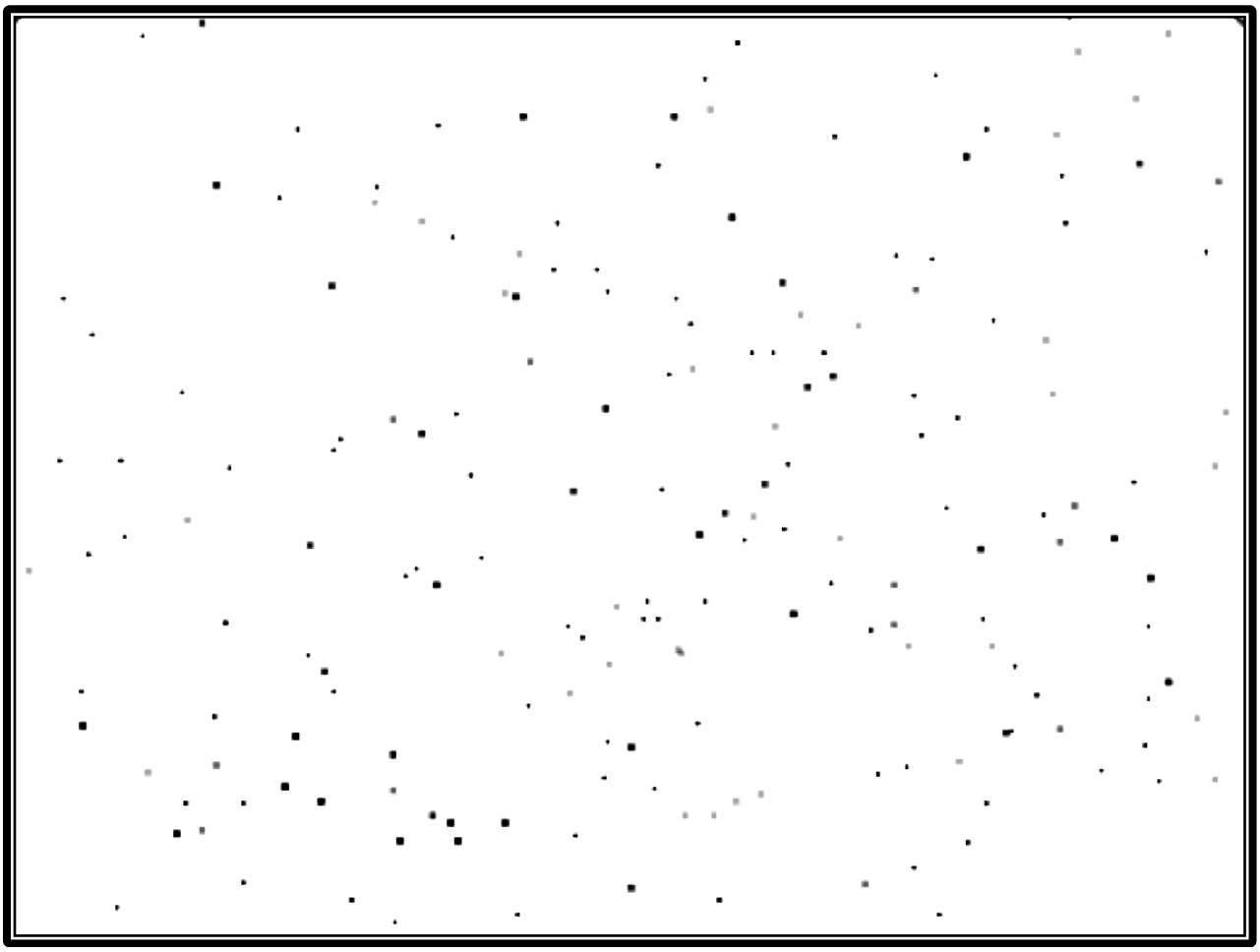
3. Some other questions to consider:
   a. How do the stars move across the sky over the course of the night?

   b. Do some things move more than others? Are some things always in the sky?

   c. Does this change with your location? Time of year?

**The Constellations**

4. Try to find your own constellations in the following star field:



5. Using Stellarium, describe what constellations are visible on your birthday.

    a. How about 3 months later?

    b. How about 6 months later?

    c. How about 9 months later?

★ Try out the constellation web app at: https://javalab.org/en/zodiac_en/

## The Phases of the Moon

6. Using Stellarium, try to answer the following questions:
   a. What do you notice about the shape of the moon from night to night?

   b. What do you notice about when the moon rises & sets from night to night?

   ★ Explore the phases of the moon using the following Lunar Phase Simulator web app: https://ccnmtl.github.io/astro-simulations/lunar-phase-simulator/

7. Using the Lunar Phase Simulator, try to answer the following questions:
   a. When is a full moon highest in the sky? A first quarter moon? A third quarter moon?

   b. Can you see the moon during the day? In which phases? When is it visible during the morning/afternoon?

## The Motions of the Planets

8. If Venus is closer to the Sun than we are, and Mars is further away, how do you think that will affect how we see these planets in the sky?

9. Using Stellarium, locate Venus and try to answer the following questions:
   a. When is Venus in the sky? (Try looking at it over several months)

   b. What do you notice about Venus' shape over the course of several days? (Try zooming in to the planet)

   ★ Explore the motion and phases of Venus using the following web app: https://foothillastrosims.github.io/alpha-venus-phase-sim/

10. Using Stellarium, locate Mars in the night sky and try to answer the following questions:
    a. How does Mars' position in the sky change from night to night? Over the course of months?

    b. How does its location in the sky change relative to the stars?

    c. What is "Retrograde Motion"?

★ Explore the motion of Mars in the night sky using the following web app: https://foothillastrosims.github.io/planetary-config-react/

**Further resources**

★ Explore the solar system: https://theskylive.com/3dsolarsystem

★ Simulate the Sun/Earth/Moon system: http://phet.colorado.edu/sims/html/gravity-and-orbits/latest/gravity-and-orbits_en.html

★ Make your own solar system: https://lab.nstmf.org/gravity

★ Stellarium downloadable desktop app: http://stellarium.org/