



Student's Guide to the Canadian Junior Astronomer Program

Wondering just what's up there in the sky? Want to learn more about astronomy the hands-on way? Want to get more involved in astronomy, but don't know how? Then the Canadian Junior Astronomer Program is for you!

Background

The Canadian Junior Astronomer Program (CJAP) was designed by an amateur astronomer and high school science teacher to literally bring the stars closer to the students. The inspiration for the program came in part from requests from current students who enjoyed astronomy, and in part from the Observing Certificates created by the Royal Astronomical Society of Canada (RASC). There are three levels to the program – **Star, Nova and Supernova** – catering to your experience in the subject. After this, you are encouraged to try the RASC's Explore the Universe Certificate.



It's Your Choice!

Throughout the three levels of the CJAP, you are offered choice in what you do. Each level is broken down into three components: **Observing, Research and Extensions**. In each of these components, you are given a choice of what you would like to do – would you rather draw the Moon or a planet? Make a scale model or create a brochure? Learn more about astronauts, or extra-terrestrial life? As long as you finish the required number of elements for each component, you will complete the level!

Where to Start?

It is recommended that you start with the Star level (designed for beginners), and then work your way up to the Supernova level (the most challenging – you will need to use a telescope for this one!). Take a look at the task lists for each level – included in this package – and decide for yourself. You can then start by printing some of the observation forms (also included) and observing the night sky, or by doing some research into some of the questions. The tasks can be done in any order, and over any length of time.

When you are finished a level, email your name and city/province to cascaed@astro.utoronto.ca. Your name will be added to our website, and if you include your school address, we will send you a certificate. Best of luck, and clear skies!



Star Level: Master Task List

Part A: Observing*

(complete any 2 of the 6 tasks below)

1. Draw the Big Dipper asterism (year-round)
2. Draw the constellation Cassiopeia (year-round)
3. Draw the constellation Orion (November through March)
4. Draw the constellation Cygnus (June through November)
5. Draw the constellation Hercules (May through October)
6. Draw any two constellations from the Zodiac**(counts as two tasks; year-round)

*Use the observation recording form in this package, or create one that contains the same information.

**Zodiac constellations are: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, Pisces

Part B: Thinking

(complete any 2 of the 7 tasks below)

1. Locate your nearest planetarium, observatory or astronomy club. What is its name, and where is it?
2. What is a lunar eclipse? When will the next one be visible from your area?
3. Why is it coldest in January, when the Earth is actually the closest to the Sun?
4. What is a comet? Where do they come from?
5. Why do we have leap years? When will the next leap year be?
6. Some astronomers think Pluto is an asteroid. Do you think it is a planet or an asteroid? How do you know?
7. What are Saturn's rings made of? Where did the rings come from?

Part C: Extensions

(complete any 2 of the 7 tasks below)

1. Add the star Polaris to one of your drawings from Part A and label it.
2. Add any planet to one of your drawings from Part A and label it.
3. Find any other constellation in the sky and draw it.
4. Draw, paint or sketch a picture of what you think the surface of any planet might look like (except the Earth!).
5. Describe the day of an astronaut in space.
6. Using an actual star map, create a new constellation and write a myth to explain it.
7. Create a saying to help you remember the order of the planets in the Solar System.



Nova Level: Master Task List

Part A: Observing*

(complete any 3 of the 7 tasks below)

1. Draw the Pleiades, open star cluster (October through March)
2. Draw any planet, as seen in the sky (varying throughout the year)
3. Draw the constellation Bootes (April through August)
4. Draw the constellation Ursa Minor/Little Dipper** (year-round)
5. Draw the Moon for 3 days in a row (year-round)
6. Draw the constellation Pegasus (August through December)
7. Draw any three constellations from the Zodiac***(counts as three tasks; year-round)

* Use the observation recording form in this package, or create one that contains the same information.

**Requires dark skies

*** Zodiac constellations are: Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius, Pisces – **these must be different than the ones drawn for the Star Level.**

Part B: Thinking

(complete any 3 of the 7 tasks below)

1. What are the Aurorae Borealis? When does your community have the best chance to see them?
2. What is a solar eclipse? What is the safest way to view one?
3. What is a light-year? How many kilometers are in a light-year? How close is the nearest star, and the nearest galaxy, in light-years?
4. How old is the Earth? The Sun? The Milky Way Galaxy? The Universe?
5. Why are major observatories built on the tops of mountains? List at least three reasons.
6. Define the term “retrograde.” Which planets move in a retrograde fashion?
7. How long does it take light to go from one end of the Milky Way Galaxy to the other? Compare this with the age of the Milky Way.





Nova Level: Master Task List

Part C: Extensions

(complete any 3 of the 8 tasks below)

1. Find a website which will tell you when you can next see the International Space Station go by overhead. When will that be?
2. Design an 8½” by 11” poster to invite people to a local “star party.”
3. What is zodiacal light? When can we see it next?
4. Draw or paint the Northern Lights, based on photos or observation.
5. USING PRECAUTIONS, observe and draw the Sun. If you are unsure how to properly observe the sun, go to <http://www.cascaeducation.ca> and visit the Solar Observing page. Viewing the Sun improperly can result in serious, irreversible damage to your eyes, and you can go blind.
6. Observe the Moon through binoculars and sketch what you see.
7. What is the ecliptic? What would an astronomer expect to find when looking along the ecliptic?
8. What is a sunspot? What happens to the Earth when there are fewer sunspots than usual on the Sun?



Supernova Level: Master Task List

Part A: Observing*

(complete any 3 of the 8 tasks below)

1. Draw the Moon, as seen through a telescope. (year-round)
2. Draw any planet, as seen through a telescope. (varying throughout the year)
3. Draw M42, the Orion Nebula. (November through March)
4. Draw the M31, the Andromeda Galaxy. (August through February)
5. Draw Brocchi's Cluster, a.k.a. the "Coathanger Cluster." (May through October)
6. Draw M44, the Beehive Cluster. (January through June)
7. Draw the double star Albireo. (May through October)
8. Draw the double star Mizar. (year-round)

***All of these observing targets require the use of binoculars or a telescope.** Use the observation recording form in this package, or create one that contains the same information.

Part B: Thinking

(complete any 3 of the 7 tasks below)

1. Determine the age of the Universe, and describe how astronomers figure out the age.
2. What is dark matter? How do we know if it exists if we cannot "see" it?
3. Astronomers have found over 100 planets outside our solar system, revolving around other stars. Describe one way of detecting these planets.
4. What is the Drake equation? What does it tell us?
5. Four man-made objects have now left our solar system. What are they? When were they launched? Where are they now?
6. Describe how the solar system formed.
7. What will happen to the Earth when the Sun uses all of its fuel and "dies?" When will this occur?





Supernova Level: Master Task List

Part C: Extensions

(complete any 3 of the 8 tasks below)

1. Construct a scale model of the solar system, using common objects.
2. Create a poster showing the life cycle of a star, from birth to supernova.
3. If the Earth was no longer inhabitable, and we had the capability to leave, where should we go? Why?
4. Draw M57, the Ring Nebula, based on actual observation. (summer)
5. Draw the M7 star cluster, based on actual observation. (summer)
6. Draw galaxy pair M81 and M82. (year-round)
7. Attend the next public meeting of a local astronomy club, and write a brief summary of the events that night.
8. Draw a detailed picture of the Milky Way Galaxy. Indicate where our solar system is found within the galaxy.

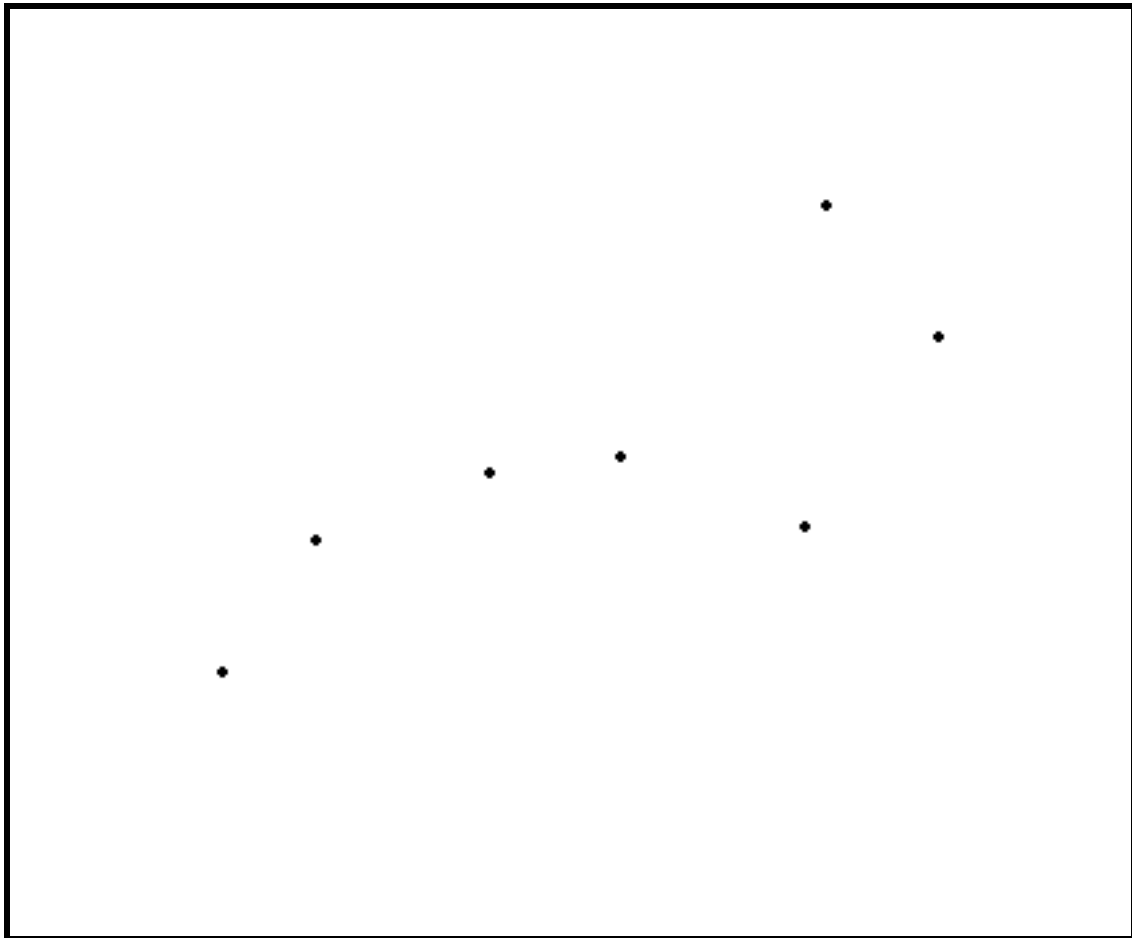


Drawing the Night Sky: Sample Observation Form

Date & Time: Friday, January 24, 7:30 - 8:30pm

Location: Schoolyard Sky Conditions: clear, little clouds

Instrument Used: Naked Eye



Object Observed: Big Dipper

Notes: it's hard to see why they call this the bear...it looks more like a saucerpan! It's very cold - hard to draw in cold weather!



Drawing the Night Sky: Observation Form

Date & Time: _____

Location: _____ Sky Conditions: _____

Instrument Used: _____

Object Observed: _____

Notes: