

PAA Novice Astronomy Curriculum

1. An Introduction to Astronomy – June 7, 2019

- Our Cosmic Address : Earth, Solar System, Milky Way, Local Group, Virgo Supercluster, Universe
- Overview of visible objects
- Sampling of exotic objects: black holes, dark energy, dark matter

2. Stars – September 6, 2019

- Sun: birth, nuclear fusion, parts, Sun spots, atmosphere, space weather, death
- Colour & Temperature: OBAFGKM
- Size comparison: include link to YouTube video
- Distance
- H/R diagram
- Variable stars
- Life cycle of stars smaller and larger than our Sun
- Take Away: Plans to build a sundial

3. The Solar System – October 4, 2019

- Sun and 8 planets: size (use scale model), distance (use scale model), physical characteristics
- Moons
- Origins of life
- Best possibilities of life in our solar system: Mars, Europa, Enceladus
- Dwarf Planets
- Comets
- Asteroids
- Meteoroid, Meteor, Meteorite

4. The Sun, Earth, Moon System – November 1, 2019

- Day & Night
- Solar eclipse (use model)
- Lunar eclipse (use model)

- Lunar phases
- Influence of Moon on Earth: tides, stabilizing influence, retreating
- Seasons

5. The Moon – December 6, 2019

- Birth: “Big Splat” Theory
- Evolution of Luna
- Historical exploration: Russian, American (Apollo 8-17)
- Current exploration: Chinese, ESA, etc.
- Discoveries: water ice, etc.
- Future? : Space station, habitation

6. The Electromagnetic Spectrum – January 3, 2020

- Image of EMS
- Visible light 400-700 nm
- Infrared
- Microwave
- Radio
- Ultraviolet
- X-rays
- Gamma rays

7. Constellations-- -February 7, 2020

- What is a constellation?
- What is an asterism?
- Historical significance: mythology (include story from more than Greek & Roman), agriculture, navigation and sea faring
- Seasonal Change
- Constellations as pointers

8. Eyepieces – March 6, 2020

- eye relief
- 1 1/4"
- 2"
- Barlows
- Neutral Density filters
- Photographic filters
- Nebula filters: UHC, Skyglow, OIII, H alpha

9. Deep Sky Objects Part 1 – April 3, 2020

- Different Catalogues: Messier, NGC, IC, Caldwell, etc.
- Galaxies
- Open Clusters
- Globular Clusters
- Double Stars
- Planetary Nebula
- Emission and Reflection Nebulae
- Use of filters
- Topic should be broken up into objects viewable through small, medium and large telescopes

10. Deep Sky Objects Part 2 – May 1, 2020

- Supernovae
- Black holes
- Neutron Stars & Pulsars
- Gamma Ray Bursts
- Blazars
- Gravitational Waves
- Possibility of observation

11. Meteor Showers – June 5, 2020

- Causes
- How to view? Equipment, procedure

- Where to view?
- Discuss showers by month
- Extraterrestrial Observations: Bright flashes on Moon, Comet Shoemaker/Levi 9 and Jupiter

12. Rocks from the sky – September 4, 2020

- Caused by asteroid or comet impact
- Vredefort crater (South Africa) 2.023 billion years ago
- Chicxulub crater (Yucatan Peninsula) 66 million years ago
- Sudbury impact basin (Ontario) 1.849 billion years ago
- Shoemaker crater (Western Australia) 1.630* billion years ago
- Manicouagan crater (Quebec) 215 million years ago
- Popigai crater (Siberia) 35 MYA
- Charlevoix crater (Quebec) 342 MYA
- Montagnais crater (Nova Scotia) 50.5 MYA
- Saint Martin crater (Manitoba) 227 MYA
- Carswell crater (Saskatchewan) 115 MYA
- Clearwater West & East craters (Quebec) 290 MYA
- State Islands crater (Ontario) 450 MYA
- Mistastin crater (Newfoundland and Labrador) 36.4 MYA
- Steen River crater (Alberta) 91 MYA
- Tunnunik crater (Northwest Territory) 130-450 MYA
- Presqu'île crater (Quebec) < 500 MYA
- Haughton crater (Nunavut) 39 MYA
- Meteor Crater (Arizona) 49 thousand years ago
- Tunguska event 1908
- Chelyabinsk meteor 2013
- Large meteorites on display: Willamette Meteorite, American Museum of Natural History; Mbozi in Tanzania; Cape York Meteorite on display in the Geological Museum of the University of Copenhagen, Denmark; Bacubirito meteorite on display in the Centro de Ciencias de Sinaloa, Mexico; El Chaco in Argentina; Hoba in Namibia

13. Exoplanets – October 2, 2020

- Methods of discovery: Doppler shift, Transit photometry
- First discovery
- HST
- Kepler
- Spitzer Space Telescope

- Amateur astronomer contributions
- Types
- Habitable Zone candidates
- Future discoveries: James Webb Space Telescope

14. Light Pollution – November 5, 2020

- see Mark Cody

15. Dark Matter & Dark Energy – December 4, 2020

- Baryonic Matter: “normal” visible matter
- Dark Matter
- Dark Energy
- Fate of the Universe

16. Space Exploration Part 1 – Historical – January 7, 2021

- Sputnik 1 & 2
- Luna
- Apollo 8-17
- Mariner
- Pioneer
- Venera
- Voyagers 1 & 2
- Viking
- Galileo
- Cassini-Huygens

17. Space Exploration Part 2 - Current & Future – February 5, 2021

- USA: NASA
- European Union: ESA
- Japan: JAXA

- China: CNSA
- India: ISRO
- SpaceX
- Virgin Galactic

18. Video Astronomy – March 5, 2021

- Benefits
- Equipment
- Types of cameras
- Remote observing
- Image capture

19. Low Earth Orbit – April 2, 2021

- Conditions of space
- Mir
- Skylab
- Hubble Space Telescope
- ISS
- Communication satellites
- Geostationary satellites
- Space junk

20. Astronomy Resources on the Net – May 7, 2021

- Sky News: skynews.ca
- NASA: nasa.gov
- Royal Astronomical Society of Canada: rasc.ca
- Canadian Space Agency: asc-csa.gc.ca
- Sky & Telescope: skyandtelescope.com
- Space Weather: spaceweather.com
- Astronomy Magazine: astronomy.com
- Space News: space.com
- Astronomy Now: astronomynow.com
- Universe Today: universetoday.com

21. Essential Astronomy Resources – June 4, 2021

- Magazines: SkyNews, Sky & Telescope, Astronomy, Sky at Night, Discover
- Books: The Backyard Astronomer's Guide (Dickinson & Dyer), Nightwatch (Dickinson), Exploring the Night Sky (Dickinson), Bad Astronomy (Philip Plait), Deep Sky Companions: The Messier Objects (O'Meara), The Zoomable Universe (Scharf), RASC Observer's Handbook, Turn Left at Orion (Consolmagno & Davis)
- Star Atlases: Sky Atlas 2000 (Tirion), Uranometria 2000 Deep Sky Atlas (Tirion et al), Cambridge Double Star Atlas (Tirion et al)
- Software: Stellarium, Starry Night, Sky Safari, Earth Centered Universe, The Sky X

22. Binoculars – September 3, 2021

- Numerical Designations Demystified eg. 10 X 50
- Suitable binoculars for astronomy
- Sizes
- Mounting
- Technique
- Focus
- Filters
- Care & Cleaning

23. Software, Apps & Observing Techniques – October 1, 2021

- see my January 2019 Novice Astronomy Class