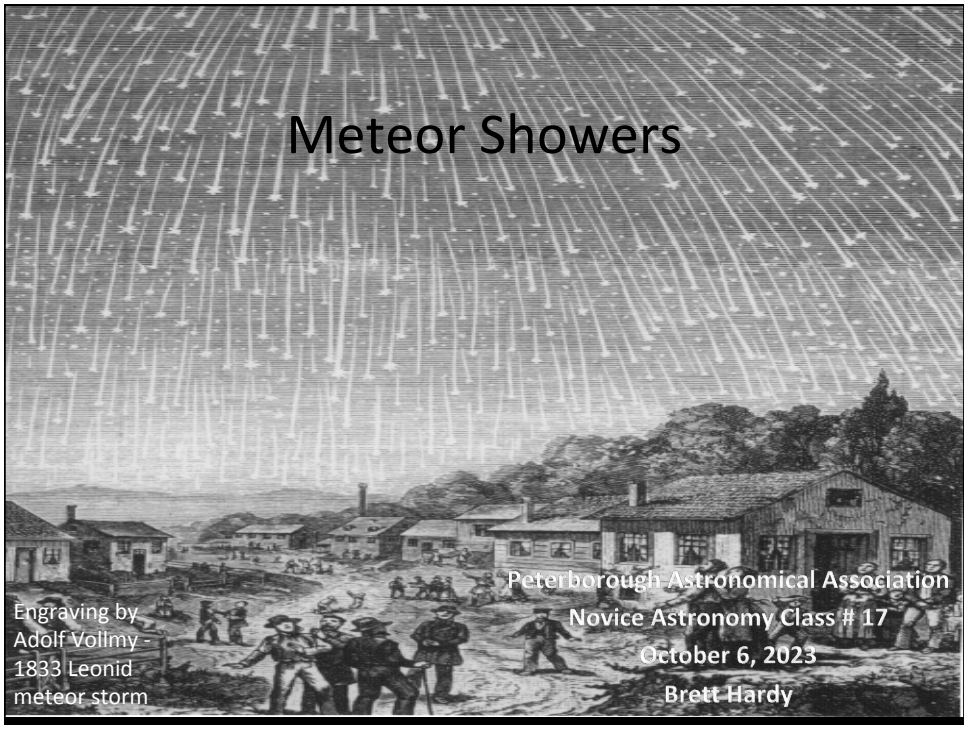
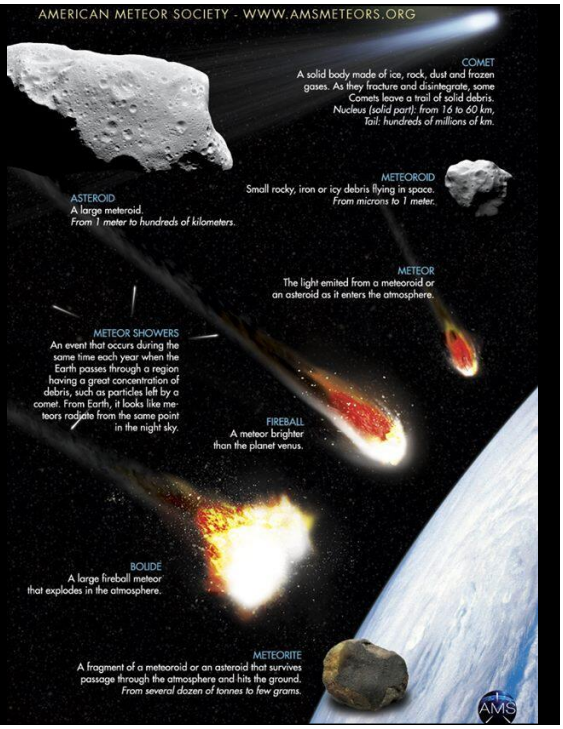


Sources of Meteors

- Comets
- Asteroids
- Reentering debris

Terminology

- Meteoroid
- Meteor
- Meteorite
- Fireball
- Bolide
- Sporadic
- Meteor Shower
- Meteor Storm



Meteors in Our Atmosphere

- Mesosphere
- Atmospheric heating
- Radiant
- Zenithal Hourly Rate (ZHR)

Equipment

Lounge chair
Blanket or sleeping bag
Hot beverage
Bug repellant - ThermaCELL
Camera & tripod
Tracking

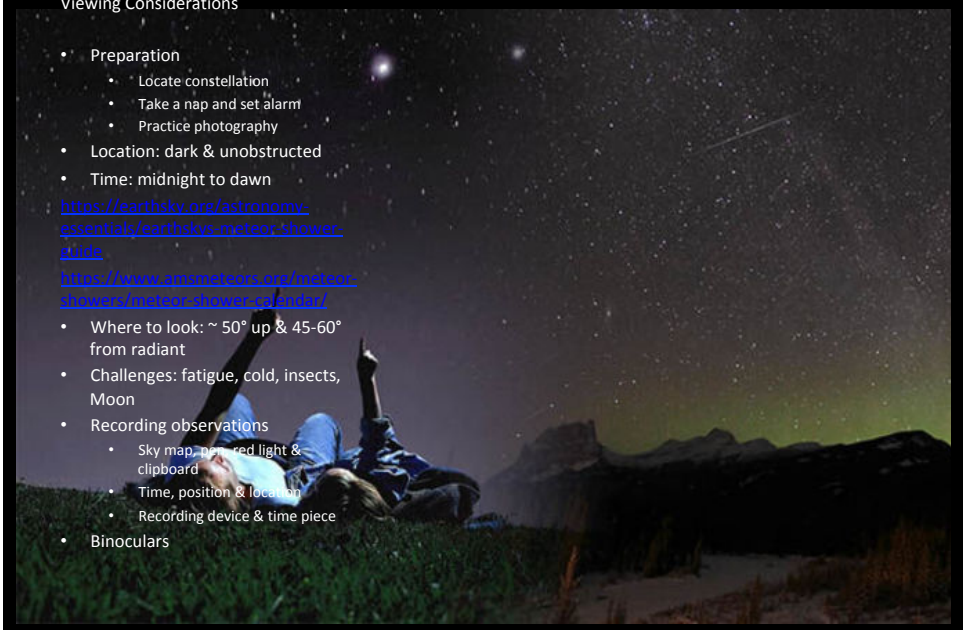
Viewing Considerations

- Preparation
  - Locate constellation
  - Take a nap and set alarm
  - Practice photography
- Location: dark & unobstructed
- Time: midnight to dawn

https://earthsky.org/astronomy-essentials/earthskys-meteor-shower-guide

https://www.amsmeteors.org/meteor-showers/meteor-shower-calendar/

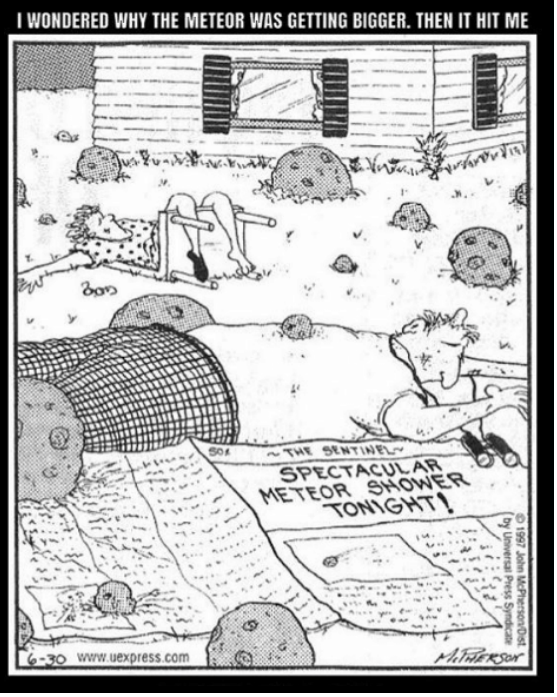
- Where to look: ~ 50° up & 45-60° from radiant
- Challenges: fatigue, cold, insects, Moon
- Recording observations
  - Sky map, pen, red light & clipboard
  - Time, position & location
  - Recording device & time piece
- Binoculars



Getty

Meteor Showers

- 112 confirmed meteor showers
- 695 awaiting confirmation
- Naming Convention
  - C/2019 Y4 (Atlas)
  - (3200) Phaethon



October

Draconids
Parent body: 21P/Giacobini-Zinner
Peak: October 8 – ZHR = variable
Slow moving – 20 km/s
Moon: Waning Crescent

Epsilon Geminids (m)
Parent body: unknown
Peak: October 19 – ZHR = 3
Fast moving – 69 km/s
Moon: Waxing Crescent

Orionids
Parent body: 1P/Halley
Peak: October 21 – ZHR = 20
Fast moving – 66 km/s
Moon: First Quarter

Leonis Minorids (m)
Parent body: C/1739 K1 (Zanotti)
Peak: October 21 – ZHR = 2
Fast moving – 62 km/s
Moon: First Quarter

Composite Draconids by Sean Parker

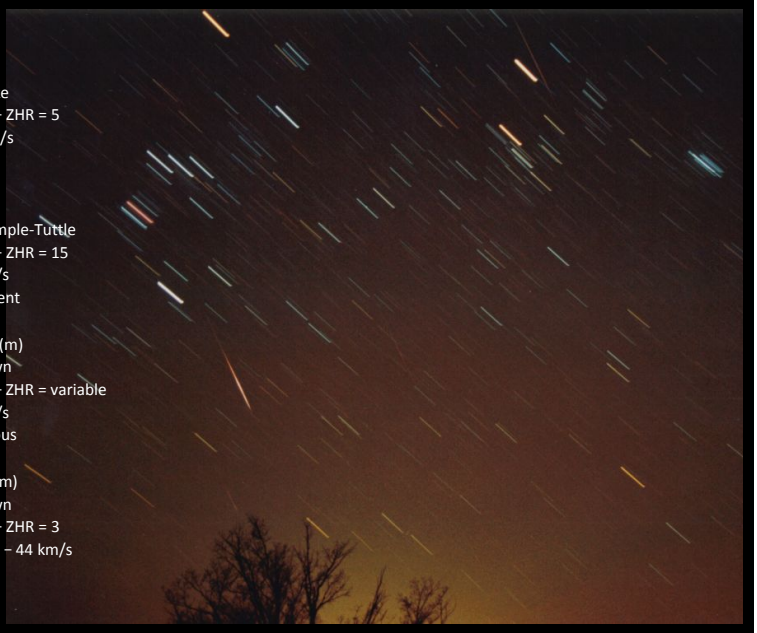
November

Northern Taurids (m)
Parent body: 2P Encke
Peak: November 13 – ZHR = 5
Slow moving – 28 km/s
Moon: Last Quarter

Leonids
Parent body: 55P Temple-Tuttle
Peak: November 18 – ZHR = 15
Fast moving – 71 km/s
Moon: Waxing Crescent

Alpha Monocerotids (m)
Parent body: unknown
Peak: November 21 – ZHR = variable
Fast moving – 63 km/s
Moon: Waxing Gibbous

November Orionids (m)
Parent body: unknown
Peak: November 30 – ZHR = 3
Intermediate moving – 44 km/s
Moon: Full Moon



Leonid by Rick Stankiewicz

December

Puppid-Velids (m)
Parent body: unknown
Peak: December 7 – ZHR = 10
Intermediate moving – 38 km/s
Moon: Waning Crescent

Geminids
Parent body: (3200) Phaethon
Peak: December 14 – ZHR = 120
Intermediate moving – 35 km/s
Moon: Waxing Crescent

Ursids
Parent body: 8P/Tuttle
Peak: December 22 – ZHR = 10
Intermediate moving – 33 km/s
Moon: Waxing Gibbous

Coma Berenicids (m) in Leo
Parent body: Unknown
Peak: December 16 – ZHR = 5
Fast moving – 64 km/s
Moon: Waxing Gibbous

Geminid by Rick Stankiewicz

January

Quadrantids
Parent body: 2003 EH1
Peak: January 4, 2024 – ZHR = 120
Intermediate moving – 41 km/s
Moon: Last Quarter

Gamma Ursae Minorids (m)
Parent body: unknown
Peak: January 19, 2024 – ZHR = 3
Intermediate moving – 31 km/s
Moon: First Quarter

Leonid by anon

February

Alpha Centaurids
Parent body: unknown
Peak: February 8, 2024 – ZHR = 6
Fast moving – 58 km/s
Moon: Waning Crescent

Alpha Centaurid by Mike Lewinski

March

No Meteor Showers

Bayeux Tapestry

April

Lyrids
Parent body: C/1861 G1 (Thatcher)
Peak: April 23, 2024 – ZHR = 18
Intermediate moving – 47 km/s
Moon: Waxing Gibbous

Pi Puppids (m)
Parent body: 26P/Grigg-Skjellerup
Peak: April 23, 2024 – ZHR = variable
Slow moving – 15 km/s
Moon: Waxing Gibbous

Lyrids by Mark Lissick

May

Eta Aquarids
Parent body: 1P/Halley
Peak: May 6, 2024 – ZHR = 60
Fast moving – 66 km/s
Moon: Waning Crescent

Eta Lyrids (m)
Parent body: C/1983 H1 (IRAS-Araki-Alcock)
Peak: May 10, 2024– ZHR = 3
Intermediate moving – 46 km/s
Moon: Waning Crescent

Halley Multicolour Camera
Team/Giotto Project/ESA

June

Tau Herculids (m)
Parent body: 73P/Schwassmann-Wachmann
Peak: June 1, 2024 – ZHR = 3
Slow moving – 15 km/s
Moon: Waning Crescent

June Bootids (m)
Parent body: 7P/Pons-Winnecke
Peak: June 27, 2024– ZHR = variable
Slow moving – 14 km/s
Moon: Waning Gibbous

Perseid by Brian Colville

July

Delta Aquarids
Parent body: 96P/Machholz
Peak: July 28, 2024 – ZHR = 20
Intermediate moving – 41 km/s
Moon: Last Quarter

Alpha Capricornids (m)
Parent body: comet 169P/NEAT
Peak: July 29, 2024 – ZHR = 5
Slow moving – 22 km/s
Moon: Last Quarter

Perseid by Brian Colville

August

Perseids
Parent body: 109P/Swift-Tuttle
Peak: August 12, 2024 – ZHR = 100
Fast moving – 59 km/s
Moon: First Quarter

Kappa Cygnids (m) in Draco
Parent body: 2008 ED69
Peak: August 17, 2024 – ZHR = 3
Slow moving – 24 km/s
Moon: Waxing Gibbous

Aurigids (m)
Parent body: C/1911 N1 (Kiess)
Peak: August 31, 2024 – ZHR = 6
Fast moving – 66 km/s
Moon: Waning Crescent

Perseids by Rick Stankiewicz

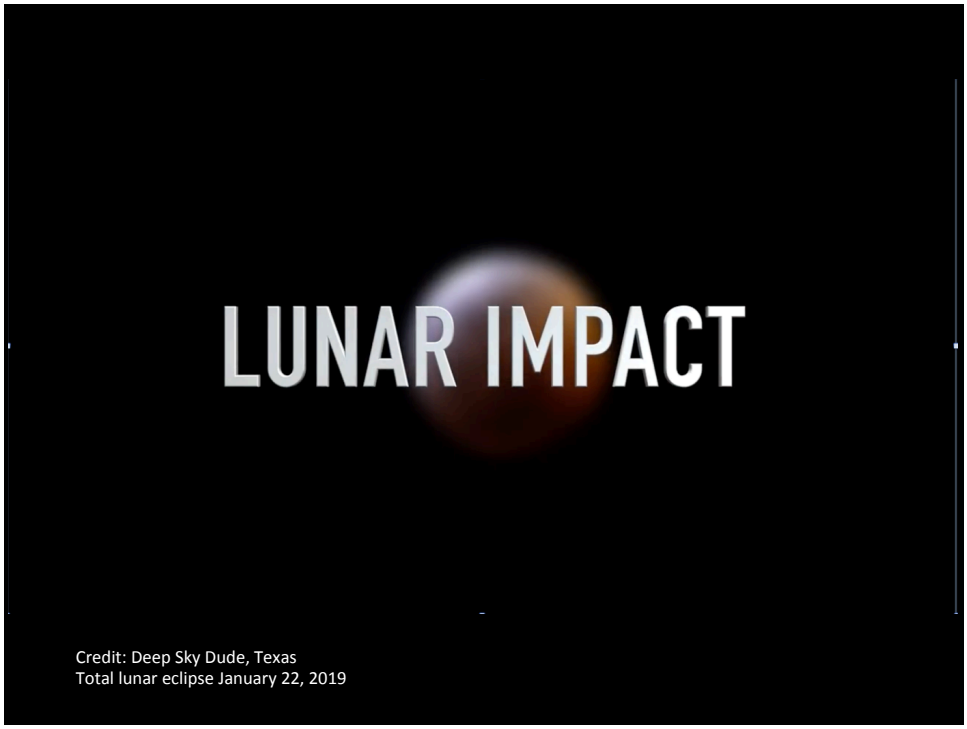
September

September Epsilon Perseids (m)
Parent body: unknown
Peak: September 12, 2024 – ZHR = 5
Fast moving – 65 km/s
Moon: Waxing Gibbous

Perseids by Brian Colville

Moon

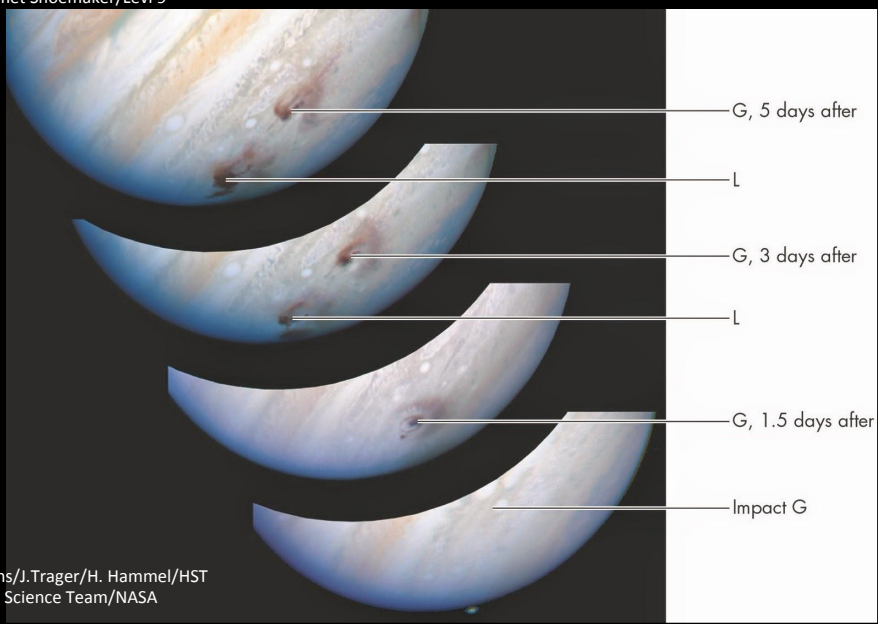
Transient Lunar Phenomena : Bright flashes on the Moon



Credit: Deep Sky Dude, Texas
Total lunar eclipse January 22, 2019

Jupiter

Comet Shoemaker/Levi 9



R. Evans/J.Trager/H. Hammel/HST
Comet Science Team/NASA

Novice Astronomy Class
18

November 3, 2023

Rocks From The Sky