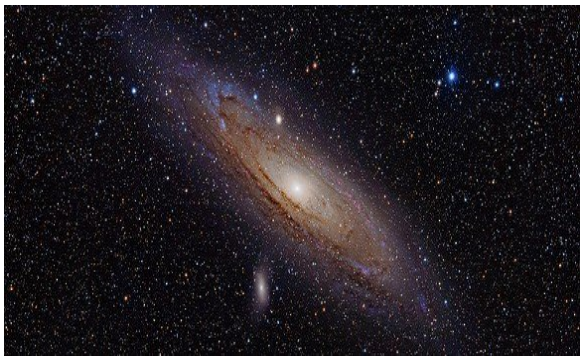
A



Name: Andromeda Galaxy
Other Names: M31
Type:

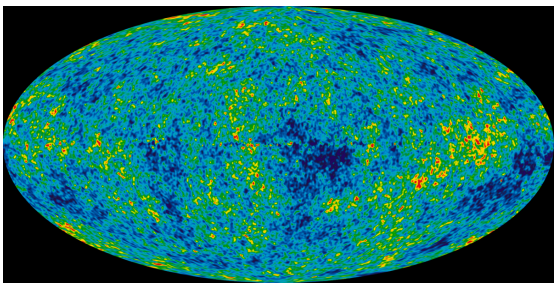
Distance: 780 kpc = 2.5 million ly
Size: 67 kpc = 220,000 ly
Mass: 1.5 x10^{12} $M_{\odot}$
Location:

B

Name: Asteroid Lutetia Rosetta
Other Names: 21 Lutetia
Type:

Distance: 2.0 - 2.8 AU from the Sun (asteroid belt)
Size: 121 x 101 x 75 km
Mass: 1.70 x 10^{18} kg = 2.8 x 10^{-7} $M_{\oplus}$
Location:

C



Name: Cosmic Microwave Background Radiation
Other Names:
Type:

Distance: 4.2 Gpc = 13.77 billion ly
Size: The size of the observable universe
Mass:
Location:

D

Name: Coma Cluster
Other Names: Abell 1656
Type:

Distance: 99 Mpc = 321 million ly
Size: 3.1 Mpc = 10 million ly
Mass: 7 x 10^{14} $M_{\odot}$
Location:

E

Name: Halley's Comet

Other Names: 1P/Halley, Comet Halley

Type:

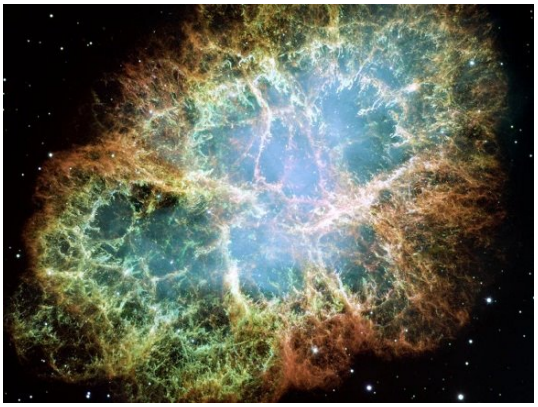
Distance: 0.59 - 35 AU from the Sun

Size: 5.5 km (mean radius of nucleus)

Mass: 2.2×10^{14} kg = 3.7×10^{-11} $M_\oplus$

Location:

F



Name: Crab - Nebula

Other Names: M1, NGC 1952

Type:

Distance: 2 kpc = 6,500 ly

Size: 1.7 pc = 5.5 ly

Mass: 4.6 $M_\odot$

Location:

G

Name: Earth

Other Names:

Type:

Distance: 1.5×10^{11} m = 1 AU (from the Sun)

Size: 6.371×10^6 m = 1 $R_\oplus$ (mean radius)

Mass: 6×10^{24} kg = 1 $M_\oplus$

Location:

H

Name: Moon

Other Names:

Type:

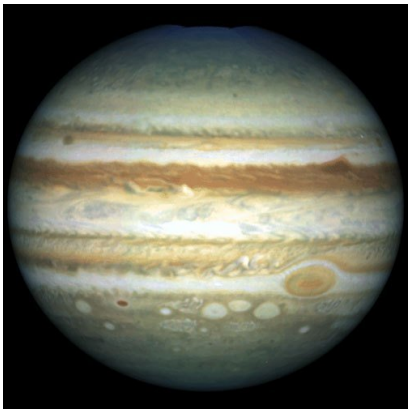
Distance: 3.844×10^8 m = 1.3 light seconds (semi-major axis or orbit)

Size: 1.737×10^6 m = 0.2727 $R_\oplus$ (mean radius)

Mass: 7.3×10^{22}kg = 0.012 $M_\oplus$

Location:

I



Name: Jupiter

Other Names:

Type:

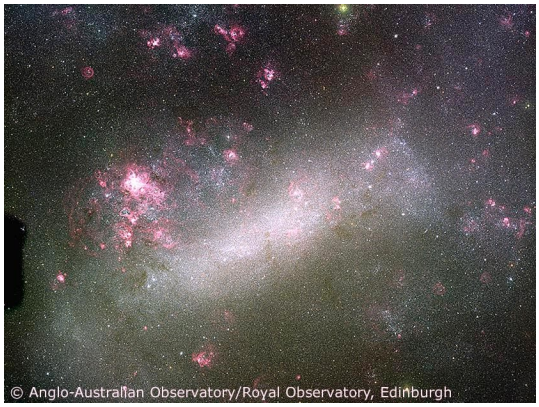
Distance: 7.79×10^{11} m = 5.2 AU = 43 light minutes from Sun (semi-major axis or orbit)

Size: 6.9×10^{7} m = 10.97 $R_{\oplus}$ (mean radius)

Mass: 1.90×10^{27} kg = 317.8 $M_{\oplus}$

Location:

J



Name: Large Magellanic Cloud

Other Names:

Type:

Distance: 50 kpc = 163,000 ly

Size: 4.3 kpc = 14,000 ly

Mass: 10^{10} $M_{\odot}$

Location:

K

Name: Whirlpool Galaxy

Other Names: Messier 51, NGC 5194, Rosse's Galaxy

Type:

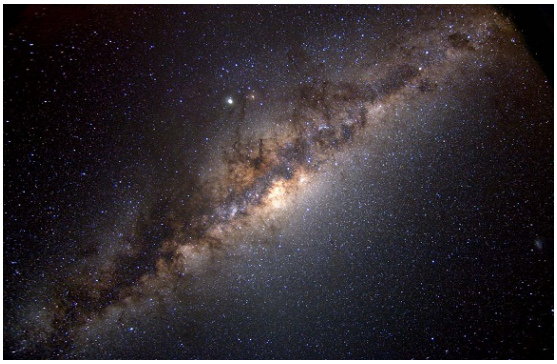
Distance: 7.1 Mpc = 23 million ly

Size: 18.4 kpc = 60,000 ly (diameter)

Mass: 160×10^{9} $M_{\odot}$

Location:

L



Name: Milky Way

Other Names:

Type:

Distance: 8 kpc = 26,400 ly (from Sun to centre)

Size: 31 – 55 kpc = 100,000 – 180,000 ly

Mass: 1.5×10^{12} $M_{\odot}$

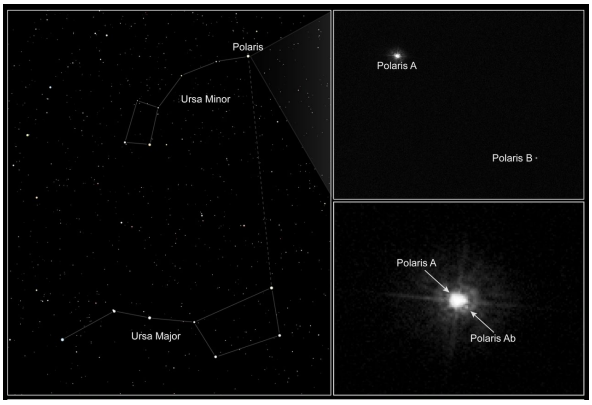
Location:

M

Name: Orion Nebula
Other Names:
Type:

Distance: 1.27 x 10^{19} m = 412 pc = 1344 ly
Size: 2.27 x 10^{17} m = 7.35 pc = 24 ly
Mass: 3.96 x 10^{33} kg = 2000 $M_\odot$
Location:

N



Name: Polaris
Other Names: North Star, Alpha Ursae Minoris, HD 8890
Type:

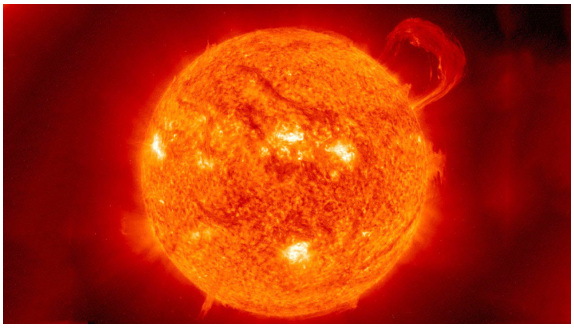
Distance: 4.1 x 10^{18} m = 132.9 pc = 433.8 ly
Size: 2.6 x 10^{10} m = 35.7 $R_\odot$
Mass: 1.07 x 10^{31} kg = 5.4 $M_\odot$
Location:

O

Name: Proxima Centauri
Other Names: Alpha Centauri C
Type:

Distance: 4.01 x 10^{16} m = 1.3 pc = 4.24 ly
Size: 1.1 x 10^{8} m (radius)
Mass: 2.42 x 10^{29}kg = 0.122 $M_\odot$
Location:

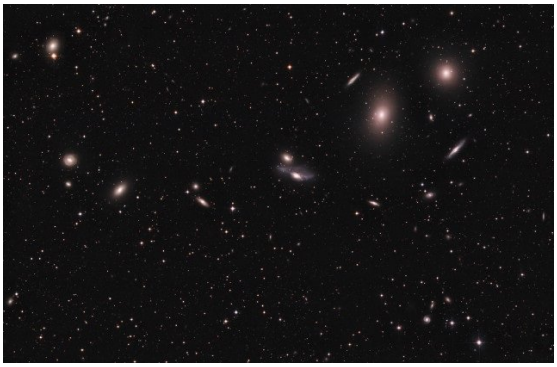
P



Name: Sun
Other Names:
Type:

Distance: 1 AU = 1.49 x 10^{11} m = 8 light minutes
Size: 6.957 x 10^{8} m = 1 $R_\odot$ (radius)
Mass: 1.98 x 10^{30} kg = 1 $M_\odot$
Location:

Q



Name: Virgo Cluster

Other Names:

Type:

Distance: 16.5 Mpc = 53.8 million ly

Size: 2.2 Mpc = 7.2 million ly

Mass: $1.2 \times 10^{15} M_{\odot}$

Location:

Z

TYPE OF OBJECT: SUGGESTED OPTIONS

(NB – not all are used in the exercise)

Large Scale Structure

Galaxy Cluster

Galaxy

Star-forming nebula

Planetary nebula

Supernova remnant

Star

Planet

Dwarf Planet

Minor Planet

Moon

Comet

Z

CHEAT SHEET: UNITS

Astronomical Unit = Mean Earth-Sun Distance

1 AU = 1.496×10^{11} m = 1.496×10^{8} km

Parsec = Distance at which 1 AU subtends angle 1 arcsecond

1 pc = 648000 / π AU = 2.06265×10^{5} AU = 3.086×10^{16} m

kiloparsec: 1 kpc = 1,000 pc :: galaxies are tens of kpc across

megaparsec: 1 Mpc = 1,000,000 pc :: very distant galaxies

Light Year = Distance travelled by light in vacuum in 1 year

1 ly = 9.461×10^{15} m = 63241 AU = 0.3066 pc

Earth:

Radius: $R_{\oplus} = 6.371 \times 10^{6}$ m = 6,371 km (mean)

Mass: $M_{\oplus} = 5.972 \times 10^{24}$ kg

Sun:

Radius: $R_{\odot} = 6.957 \times 10^{8}$ m = 695,700 km = 109 $R_{\oplus}$

Mass: $M_{\odot} = 1.98 \times 10^{30}$ kg = 331,000 $M_{\oplus}$

Z