

# Exoplanet Project

## Extra Help!

Always include units in your calculations.  
Get your worked checked by your teacher!

# Exoplanet Project Conversions

- What is scientific notation?
- What is an AU?
  - Astronomical Unit
  - Distance from Earth to the Sun
  - 149, 597, 871 km
  - 149, 597, 871, 000 m
- Research you will have to do...
  - Mass of the Earth-  $5.9 \times 10^{24}$  kg
  - Radius of Earth-  $6.378 \times 10^6$  m and 6378 km
  - Mass of Sun-  $1.989 \times 10^{30}$  kg
  - Radius of Sun- 696,340,000 m and 696,340 km

# How to convert (for mass, radius and AU)

## Examples:

Your planet is 0.1 AU from its star, find in km

$$0.1 \text{ AU } (149,597,871 \text{ km}) = 14,959,787 \text{ km}$$

Your planet is 1.4 mass of Earth

$$1.4 (5.972 \times 10^{24} \text{ m}) = 8.360 \times 10^{24} \text{ kg}$$

SHOW YOUR WORK ON YOUR PROFILE SHEET

# Scientific Notation 101

<https://www.youtube.com/watch?v=Wf-HIVqZPHY>







## SCIENTIFIC NOTATION



$$\begin{array}{rcccl} 4500000 & = & 4.5 & \times & 10^6 \\ & & \text{Coefficient} & & \text{Base} \quad \text{Exponent} \\ 0.00453 & = & 4.53 & \times & 10^{-3} \end{array}$$

Use the type of star (O, B, A, etc) when you research your star.

When you look up your star you probably won't be able to find this information!

Main Sequence Stars							
							
Spectral Type:	O	B	A	F	G	K	M
Temperature:	40 000K	20 000K	8500K	6500K	5700K	4500K	3200K
Radius (Sun=1):	10	5	1.7	1.3	1.0	0.8	0.3
Mass (Sun=1):	50	10	2.0	1.5	1.0	0.7	0.2
Luminosity (Sun=1):	100 000	1000	20	4	1.0	0.2	0.01
Lifetime (million yrs):	10	100	1000	3000	10 000	50 000	200 000
Abundance:	0.00001%	0.1%	0.7%	2%	3.5%	8%	80%

Giant Stars	White Dwarfs	Supergiant Stars
Low mass stars near the end of their lives.	Dying remnant of an imploded star.	High mass stars near the end of their lives.
Spectral Type: Mainly G, K or M	Spectral Type: D	Spectral Type: O, B, A, F, G, K or M
Temperature: 3000 to 10 000K	Temperature: Under 80 000K	Temperature: 4000 to 40 000K
Radius (Sun=1): 10 to 50	Radius (Sun=1): Under 0.01	Radius (Sun=1): 30 to 500
Mass (Sun=1): 1 to 5	Mass (Sun=1): Under 1.4	Mass (Sun=1): 10 to 70
Luminosity (Sun=1): 50 to 1000	Luminosity (Sun=1): Under 0.01	Luminosity (Sun=1): 30 000 to 1000 000
Lifetime (million yrs): 1000	Lifetime (million yrs): -	Lifetime (million yrs): 10
Abundance: 0.4%	Abundance: 5%	Abundance: 0.0001%

rpowers