

HOW BIG IS THE UNIVERSE?

If the **Earth** was the size of a **5 cent** piece –

- The sun's diameter = 2.18m
- The distance from the sun to the Earth = 235m
- The distance from the sun to Pluto = 8.78km

If the **Sun** was the size of a **5 cent** piece –

- The distance to Alpha Centauri = 580 km
- The distance to the centre of the Milky Way = 3.3 million km
- The diameter of the Milky Way = 13 million km

Light Years

A light year is a distance, not a time. It is the distance that light would travel in one year. Light travels at 300 000 km per second in a vacuum. This means that a light year is 9.4×10^{12} km. Written another way this is 940 000 000 000km! The distance from the sun to the Earth is only 0.000016 light years. Light from the sun takes 8.3 minutes to reach us. Light from the nearest star to us, Alpha Centauri, would take 4.2 years to reach us. The distance from Earth to the centre of the Milky Way is 25 000 light years, so light from our sun would take 25 000 years to be seen in the galactic centre. The Milky Way Galaxy is 100 000 light years across.

The closest galaxy to our own is the Large Magellanic Cloud that can be seen in the night sky from Australia. It is 160 000 light years away. The distance to another well known galaxy, Andromeda, is 2.2 million light years. Galaxies seem to be arranged in clumps. Our galaxy lies in an area 3 million light years across called our 'local group' that includes another 24 galaxies. There are about 100 billion galaxies in the universe. The most distant galaxies are about 13 billion light years away from us. This probably means that some of the galaxies and stars we see in the night sky no longer exist!

Questions

1. How far is it from the sun to Earth in light years?
2. What is a light year?
3. Explain why we don't use light years when talking about the distances in our solar system.
4. Compare the distances between objects within our solar system and beyond our solar system.
5. Place the following in order from the closest to the Earth to the furthest away from the Earth: Alpha Centauri, Large Magellanic Cloud, sun, centre of the Milky Way, Andromeda.
6. It is often said that the universe is mostly empty space. Discuss this statement.
7. If the fastest possible speed any spaceship could travel is less than the speed of light, explain why travel to and from other galaxies is unfeasible for humans?

ASTRONOMY WORD SEARCH

Activity **Find 30 words!** NAME: _____
 Find the following words in the grid. They can go forward, backwards, up, down or diagonally.

W	E	A	R	T	H	E	H	N	E	P	T	U	N	E	P	Q	R
P	I	B	J	M	Y	N	X	Y	P	X	F	N	S	S	L	U	C
G	H	G	V	A	F	H	E	P	D	G	Z	P	K	L	U	A	O
A	N	A	V	R	C	E	C	B	U	R	I	F	B	I	T	S	N
L	U	D	S	S	T	L	O	I	U	L	O	M	T	G	O	A	S
I	D	N	V	E	E	I	M	S	C	L	S	G	D	H	V	R	T
L	A	V	I	E	S	U	E	E	U	H	A	A	E	T	J	A	E
E	S	E	M	V	N	M	T	M	V	I	Z	Z	R	N	K	A	L
O	T	N	E	W	E	U	V	G	J	U	P	I	T	E	R	W	L
M	E	U	T	N	M	R	S	L	S	A	T	U	R	N	F	V	A
E	R	S	E	S	Z	O	S	U	P	E	R	N	O	V	A	M	T
R	O	D	O	T	Z	M	C	E	G	A	L	A	X	Y	G	S	I
C	I	U	R	A	N	U	S	I	C	R	A	T	E	R	M	U	O
U	D	U	C	R	B	L	A	C	K	-	H	O	L	E	Y	N	N
R	S	M	E	T	E	O	R	I	T	E	L	E	S	C	O	P	E
Y	Q	V	V	S	F	P	T	O	L	E	M	Y	N	P	R	Z	K

Write down all the words found.