Light Years

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Is a light year a unit of time?

Step 1 · Definition

A light year is the distance light travels through space in one year.

Step 2 · So

It is a unit of distance, even though it has 'year' in its name.

Answer: No — it is a distance

Check: Like saying a town is '20 minutes away' by car: a time used to describe a distance.

2. Now try one with the steps

Sirius is 8.6 light years away. How long has its light been travelling?

Step 1 · Meaning

Step 2 · So

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is a light year? [1]

2. Is a light year a unit of time or of distance? [1]

3. Proxima Centauri is 4.2 light years away. How many years does its light take to reach us? [1]

4. A star is 100 light years away. How many years ago did the light we see tonight leave it? [1]

5. Why do astronomers use light years rather than kilometres? [1]

6. The Milky Way is about 100 000 light years across. How many years does light take to cross it? [1]

7. How many seconds are there in a 365-day year? [2]

8. Light travels 300 000 km every second. Using your answer above, how far does it travel in a year, in trillion km (to 2 decimal places)? [2]

9. Two stars lie in the same direction, 4 and 10 light years from Earth. How far apart are they, in light years? [1]

10. Sirius is 8.6 light years away. Using 1 light year ≈ 9.5 trillion km, how far is it in trillion km? [2]

11. A star 500 light years away explodes today. In how many years will we see the explosion? [1]

12. The Andromeda Galaxy is 2.5 million light years away. What does this tell you about the light you see from it? [2]

13. A space probe is 2 light-hours away. Engineers send it a command and wait for a reply. How long, in hours, until the reply arrives? [2]

14. The Sun is about 8.3 light-minutes away. Explain what this means. [1]

4. Before you hand it in

"A light year is how long light takes to reach us."
A light year is the distance light travels in one year (about 9.46 trillion km).

"We see stars are now."

We see a star was when its light left it.

Forgetting the round trip for signals.

Double the one-way time for a message and its reply.