

How Long Will the Sun Live?

Calculating the Sun's Lifespan

Classroom Activity

Overview

Age Range:

16-18

Prep. Time:

0

Lesson Time:

1 hour

Cost per activity:

Low (printing costs)

Includes the use of:

Calculator

Outline

Students will follow their worksheets to make calculations based around our Sun and its life.

The activity is designed for A-level students looking at mass defect and the use of equations.

Pupils will Learn:

- How to calculate a Stars lifespan
- Use of equations in physics

Lesson Plan:

Overview of the time required to complete lesson.

Description	Time	Notes
Introduction to the subject	15 min	
Activity 1	30-45 min	Use: 'StudentGuide_HowLongWillTheSunLive.pdf'

Online Observatory: onlineobservatory.eu

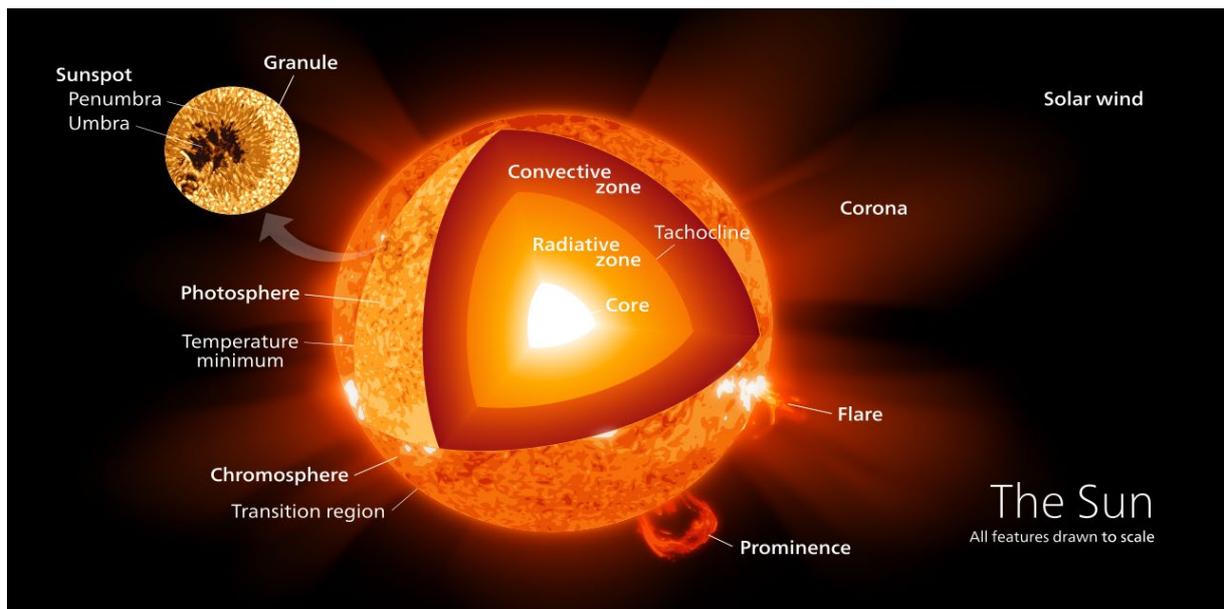
The online observatory collaboration consists of the following partners:

Baldone Observatory, Brorfelde Observatory, Cardiff University, Harestua Solar Observatory, Helsinki Observatory



Optional further activities	15 min	There are two further activities to be done if students finish ahead of time, either a continuation of the calculations-based work or a research activity that will require internet access. These can also be set as homework.
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Introduction to the subject:



Kelvinsong/Wikimedia Commons

In the nineteenth century scientists knew, from the rocks, that the Earth was millions of years old or more. Thus, the Sun had to have existed for the same time but no one knew what kind of fuel powered the Sun for so long. In the twentieth century, scientists such as Hans Bethe and Arthur Eddington discovered that the Sun converts hydrogen to helium in its core, under enormous pressure and temperature. This stage in the Sun's life is called the Main Sequence. When the core hydrogen runs out the Sun will swell up into a giant and new fusion sequences will start. In this process, inner planets, like the Earth, will be damaged, even destroyed.

So, how long before this happens? We will carry out a series of calculations to find the answer. Throughout we will use SI units; kilograms, metres, seconds.

Activity 1:

- Each student will need a copy of the student guide and calculator

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Introduce the activity, telling students they need to read the information at each section and answer the questions. Checking their answers for each one as they may affect future questions.

1. Finding the mass 'Ms' of the Sun.
2. Finding the power of the Sun.
3. Finding the mass consumed by fusion in the Sun's core.
4. How much hydrogen is used in core fusion every second?
5. How long does that hydrogen last?
6. How old is the Sun now and how much time is left?
7. Is this answer correct?

Further Activities:

- Finding Earth's mass and comparing it to the Sun
- Scientists research