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Level 2 Earth and Space Science, 2018

91192 Demonstrate understanding of stars and planetary systems

9.30 a.m. Thursday 8 November 2018
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of stars and planetary systems.	Demonstrate in-depth understanding of stars and planetary systems.	Demonstrate comprehensive understanding of stars and planetary systems.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL

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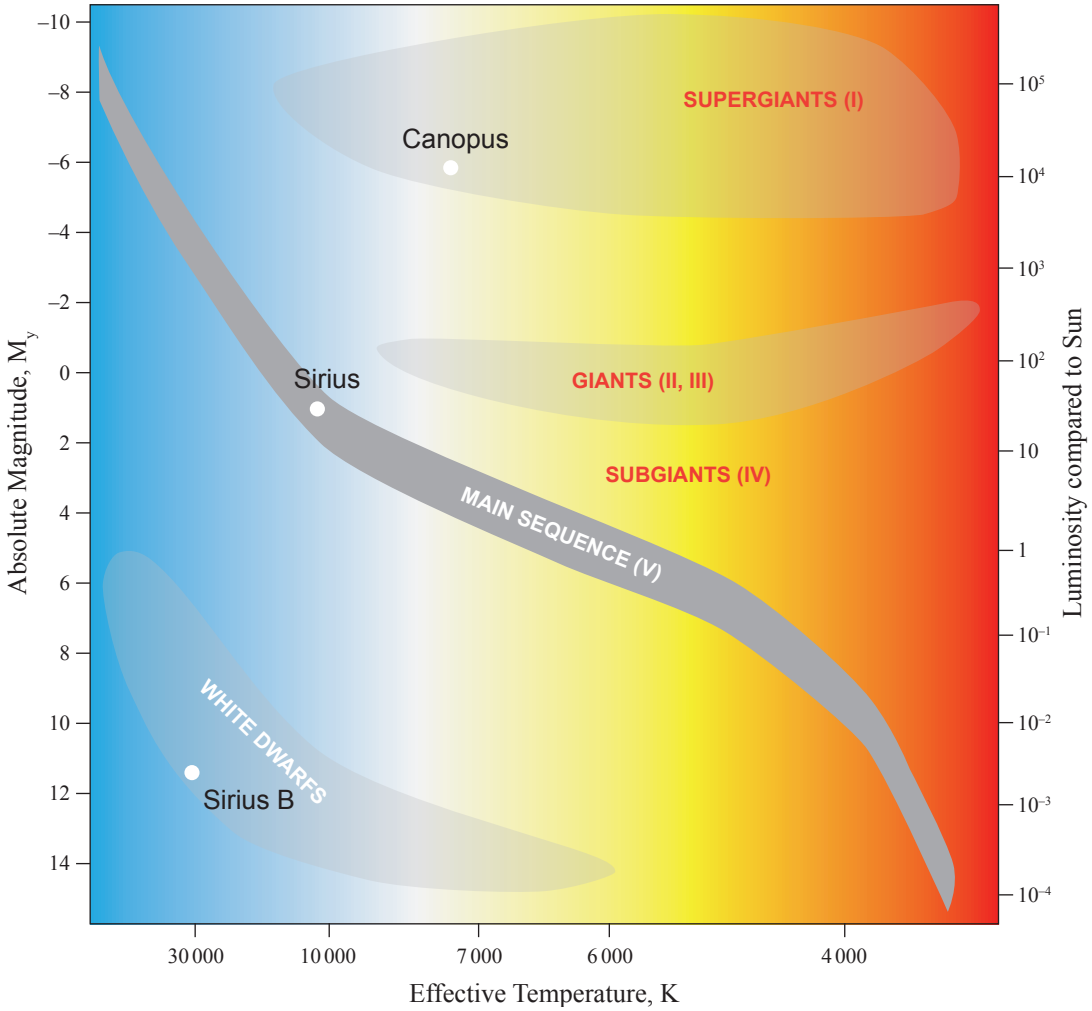
Resource

Hertzsprung-Russell (HR) Diagram



Adapted from: http://astronomy.swin.edu.au/cosmos/h/hertzsprung-russell+diagram

QUESTION ONE: CANOPUS

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Canopus is a blue-white supergiant star, approximately 71 times the size of the Sun. It can be considered to be a high-mass star.

Explain in detail the THREE life stages of Canopus in terms of:

- gravity
- mass
- fuel source and usage
- energy changes.

You should refer to the HR diagram on page 2 to assist your answer, and you may draw an annotated diagram(s) in the box below.

More space for this answer is available on the following pages.

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QUESTION TWO: ORION

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http://hubblesite.org/image/1826/news_release/2006-01

The Orion Nebula is a bright area of the night sky found just below Orion's belt (the pot). It contains many stars that have dust particles around them. These dust particles are thought to be the beginning of a solar system that could orbit the star.

Explain in detail how a solar system could form over time around a star in the Orion Nebula.

In your answer, you should refer to:

- the factors that affect planet formation
- the stages in the formation of planets
- the relative sizes and composition of the inner and outer planets AND how this relates to the material from which they have formed.

You may draw an annotated diagram in the box below to assist your answer.

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More space for this answer is available on the following page.

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QUESTION THREE: SIRIUS (THE DOG STAR)

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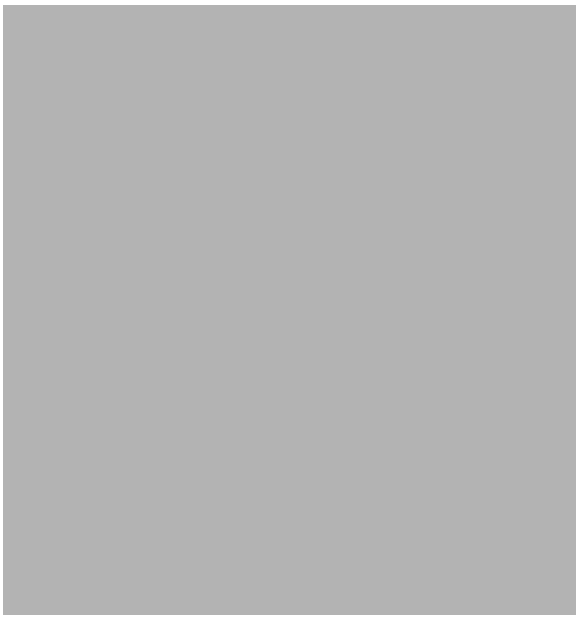

www.spacetelescope.org/images/heic0516a/

Sirius, the Dog Star, is seen as one extremely bright star in our night sky, but it is actually two stars called Sirius and Sirius B. It is thought they formed at the same time, as they are so close together. At the time of formation, one of the stars was smaller, and this smaller star is now not as far through its life cycle.

Which star in the Sirius system (Sirius or Sirius B) was initially smaller?

Explain your answer in detail, referring to the life cycles of BOTH stars.

In your answer, you should consider:

- the type of star
- its formation
- its size
- its fuel source and usage.

You should refer to the HR diagram on page 2 to assist your answer, and you may draw an annotated diagram in the box below.

More space for this answer is available on the following pages.

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Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

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