



The Life Cycle of a Star Mark Scheme

Compare the life cycle of a star about the same size as the Sun and the life cycle of a star much more massive than the Sun, after the main sequence stage.

Level 3: All stages of both life cycles (including either black hole or neutron star) are named and correctly sequenced. The life cycles are compared, including references to the mass of the stars and heavy elements.	5-6
Level 2: Most stages of both life cycles (including either black hole or neutron star) are named and correctly sequenced. There is a simple description for most of the stages.	3-4
Level 1: Relevant statements are made. Two marks can be awarded for two correct statements.	1-2
No relevant content.	0
<p>Indicative Content</p> <ul style="list-style-type: none">• mass of a star determines which life cycle/path the star will take fusion of larger nuclei (in the main sequence star)• causes an increase in thermal energy• which results in a rapid expansion <p>Star about the same size as the Sun:</p> <ul style="list-style-type: none">• as it expands it cools• to form a red giant• smaller nuclei fuse here/nuclei up to carbon/iron is not formed here• fusion stops• the star collapses/contracts/shrinks inwards• to form a white dwarf• the star fades/dims/cool• stops emitting energy/radiation• and forms a black dwarf <p>Star much more massive than the Sun:</p> <ul style="list-style-type: none">• as it expands it cools• to form a red super giant• nuclei as large as iron can fuse here• the heavy elements cause a dense core• the star collapses/contracts• then explodes outwards• in a supernova• elements heavier than iron are produced• most supernovas form neutron stars• very dense core• no fusion• the largest supernovas form black holes• strong gravity• means nothing/not even light can escape	