

# Information Worksheet

## The Life of a Star

Answer each of the following questions on a separate sheet of paper.

### Average Stars

- About one Stellar Mass
- Approximate mass of our sun

1. Describe each stage in detail.

Stage 1:

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Stage 2:

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Stage 3:

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Stage 4:

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Stage 5:

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Stage 6:

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Stage 7:

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Stage 8:

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Stage 9:

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**Massive Stars**

- 2 to 3 times Stellar Mass
- Mass up to about 3 times that of the sun

1. Which stages of a massive star’s life are the same as an average star? \_\_\_\_\_
2. When you make your concept map, how would you show these stages are the same? \_\_\_\_\_
3. How would you show those stages that are different?  
\_\_\_\_\_
4. List and describe the remaining stages of a massive star’s life.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Gigantic Stars**

- 5 to 6 times Stellar Mass
- Mass up to about 50 times that of the sun

5. Which stages of a gigantic star’s life are the same as an average star? \_\_\_\_\_
6. When you make your concept map, how would you show these stages are the same? \_\_\_\_\_
7. Which stages of a gigantic star’s life are the same as a massive star? \_\_\_\_\_
8. How would you show those stages that are different?  
\_\_\_\_\_
9. List and describe the remaining stage of a gigantic star’s life.  
\_\_\_\_\_  
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# Sample Answer Key: Information Worksheet

(Answers can vary depending on the wording of the reading material you use.)

## Average Star

**Stage 1-** Stars are born in a region of high density *Nebula*, and condense into a huge globule of gas and dust which contracts under its own gravity.

**Stage 2 -** A region of condensing matter will begin to heat up and start to glow forming *Protostars*. If a protostar contains enough matter, the central temperature reaches 15 million degrees centigrade.

**Stage 3 -** At this temperature, nuclear reactions in which hydrogen fuses to form helium can start.

**Stage 4 -** The star begins to release energy, stopping it from contracting even more and causing it to shine. It is now a *Main Sequence Star*.

**Stage 5 -** A star of one solar mass remains in main sequence for about 10 billion years, until all of the hydrogen has fused to form helium.

**Stage 6 -** The helium core now starts to contract further and reactions begin to occur in a shell around the core.

**Stage 7 -** The core is hot enough for the helium to fuse to form carbon. The outer layers begin to expand, cool and shine less brightly. The expanding star is now called a *Red Giant*.

**Stage 8 -** The helium core runs out, and the outer layers drift off away from the core as a gaseous shell. The gas that surrounds the core is called a *Planetary Nebula*.

**Stage 9 -** The remaining core (80% of the original star) is now in its final stage. The core becomes a *White Dwarf*. The star eventually cools and dims. When it stops shining, the now dead star is called a *Black Dwarf*.

## Massive Stars

1. Stages 1-4 should be the same.
2. *Answers may vary:* Use one note card for the information, but list both categories on the card.
3. *Answers may vary:* Branch off from stage 4 and make two paths--one for average stars and one for massive stars.
4. Stage 5 - The stars shine steadily until the hydrogen has fused to form helium (it takes billions of years in a small star, but only millions in a massive star).

Stage 6 - The massive star then becomes a *Red Supergiant* and starts off with a helium core surrounded by a shell of cooling, expanding gas. The massive star is much bigger in its expanding stage.

Stage 7 - In the next million years, a series of nuclear reactions occur forming different elements in shells around the iron core.

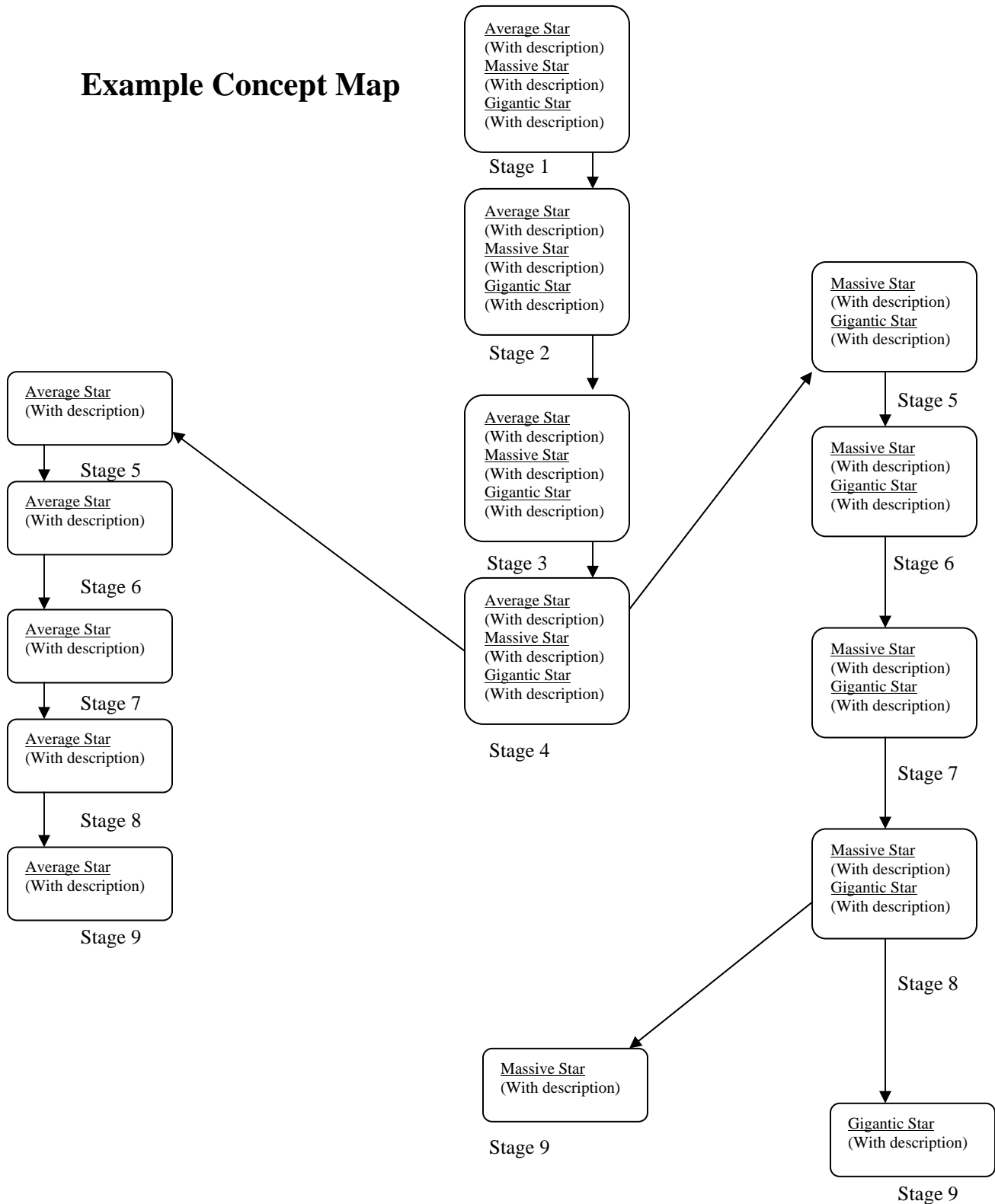
Stage 8 - The core collapses in less than a second, causing an explosion called a *Supernova*, in which a shock wave blows off the outer layers of the star. (The actual supernova shines brighter than the entire galaxy for a short time.)

Stage 9 - Sometimes the core survives the explosion. If the surviving core is between 1.5 - 3 solar masses it contracts to become a tiny, very dense *Neutron Star*.

## Gigantic Stars

5. Stages 1 – 4 should be the same.
6. *Answers may vary:* Use one note card for the information, but list all categories on the card.
7. Stages 1 – 8 should be the same.
8. *Answers may vary:* Branch off from stage 8 and make two paths--one for massive stars and one for gigantic stars.
9. Stage 9 - The core contracts to become a *Black Hole*.

# Example Concept Map



## Concept Map Rubric

ATTRIBUTE	EMERGING	COMPETENT	EXEMPLARY
<b>INVESTIGATE &amp; RESEARCH</b>	Little inquiry. Limited knowledge shown.	Explores topic with curiosity. Adequate knowledge from variety of sources displayed.	Knowledge base displays scope, thoroughness, and quality.
<b>ANALYZE &amp; EXAMINE</b>	Separates into few parts. Detects few connections or patterns.	Sifts and organizes information. Detects patterns. Connects information to explain the topic.	Prospects for patterns and connections. Uses plans or models to explain the nature of the whole topic.