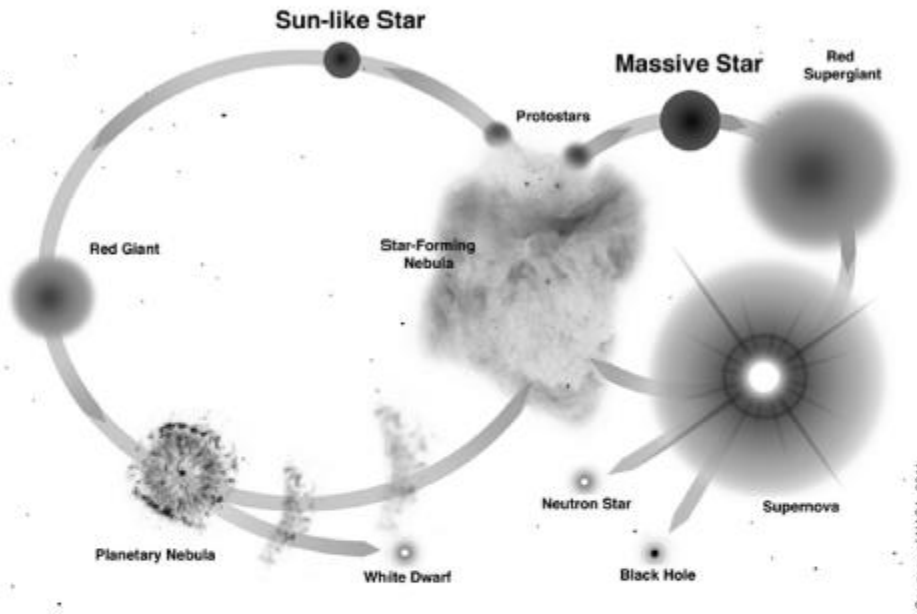


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Name: _____

Period: _____

Directions: The diagram below describes the usual processes of star formation and destruction. Use the diagram and your knowledge of science to answer any questions that follow.



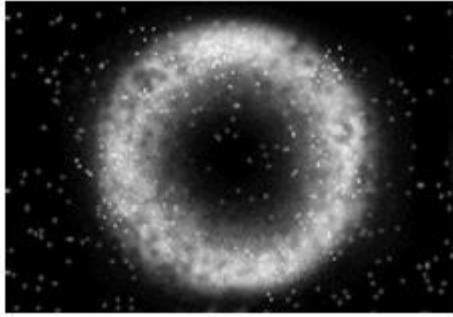
- 1 A planetary nebula is the phase of a —
 - A star late in its life.
 - protostar before it becomes a white dwarf.
 - star before it becomes a black hole.
 - planet before it becomes a star.

- 2 Which statement about the universe is correct?
 - It is known as the Milky Way.
 - It is made up mostly of empty space.
 - It is gradually getting smaller.
 - It consists of one Sun, nine planets, and satellites.

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- 3 Nick's teacher explained that there are certain objects that most likely exist at the center of every galaxy. These objects are so dense that their gravitational fields suck everything in, including light. They form when a galaxy or star collapses under the pull of its own gravity. Nick knows that these objects are called —
- A black holes.
 - B blue giants.
 - C nebulae.
 - D quasars.
- 4 Galaxies, which can contain up to a trillion stars, come in three types: spiral, elliptical, and irregular. Earth's galaxy is spiral, with a central disc and bright arms that rotate around the center. Which picture shows Earth's spiral galaxy?

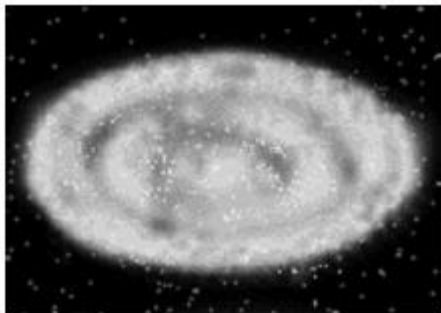
F



G



H



J

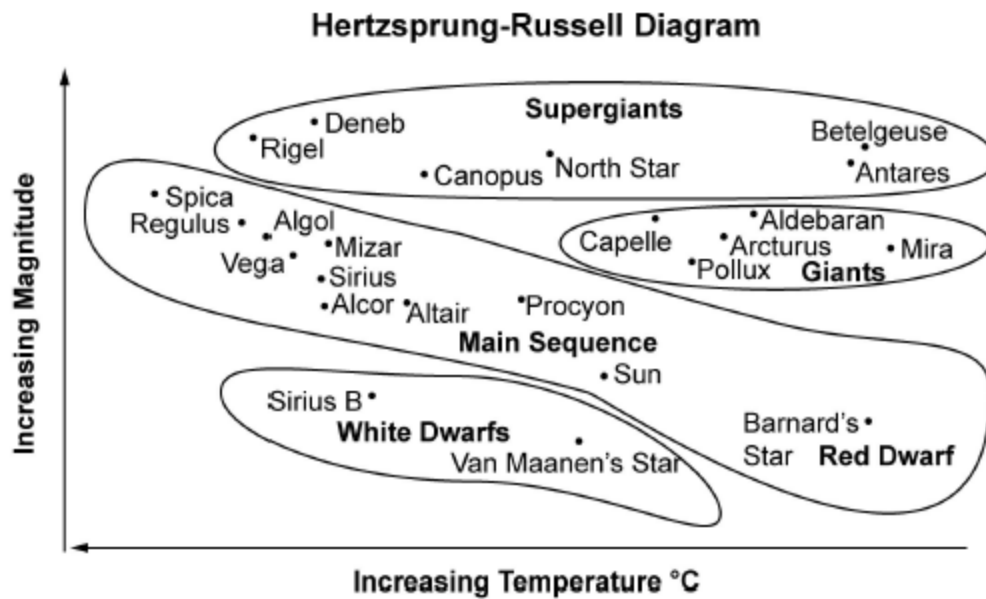


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5 Earth is a part of the galaxy known as the —

- A Triangulum galaxy.
- B Omega Centauri.
- C Andromeda galaxy.
- D Milky Way.

Directions: A Hertzsprung-Russell diagram is shown below. Use the diagram to answer any questions that follow.



6 What do our Sun and the star Vega have in common?

- F Both have the same magnitude.
- G Both are main sequence stars.
- H Both are part of the same solar system.
- J Both have the same temperature.

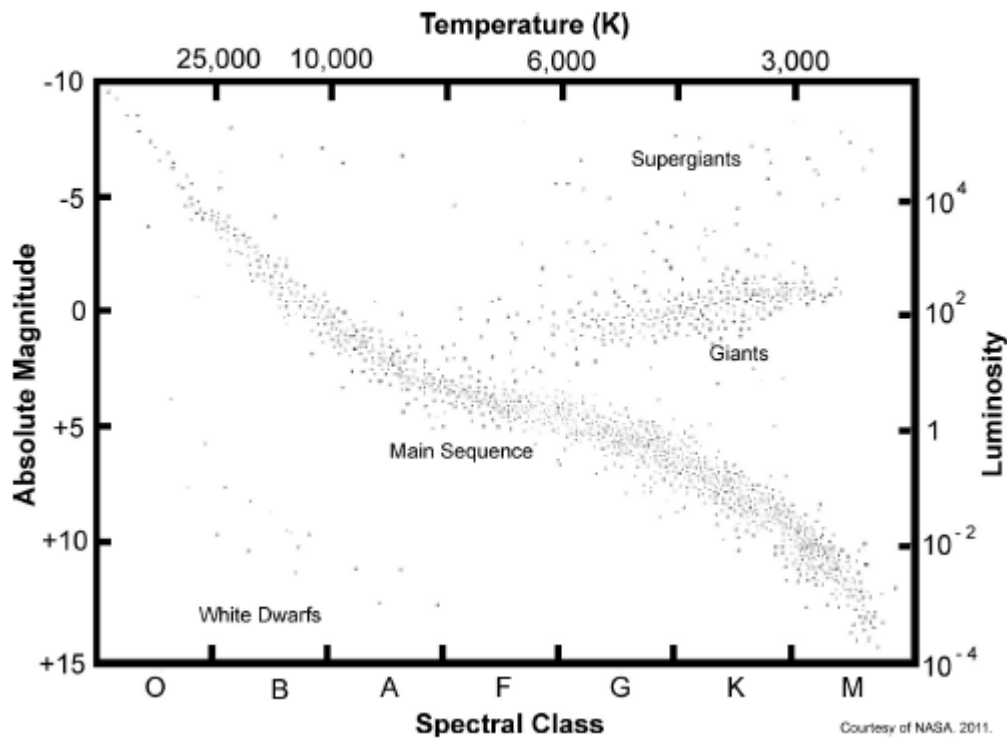
7 Around 1910, two astronomers named Hertzsprung and Russell discovered a relationship that the stars in the main sequence have in common. What is this relationship?

- A Stars with greater magnitudes tend to have lower temperatures.
- B Stars with greater masses tend to have lower temperatures.
- C Stars with greater magnitudes tend to have higher temperatures.
- D Stars with greater temperatures tend to have lower magnitudes.

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- 8 Which one of the following is NOT true of stars?
- F Stars are primarily made of hydrogen and helium.
 - G Stars have smaller masses than planets.
 - H Stars generate radiant energy from a fusion reaction at the nuclear level.
 - J Stars have a larger gravitational force than planets.

Directions: The Hertzsprung-Russell diagram below displays the temperature and magnitude of thousands of stars in the galaxy. Use the diagram and your knowledge of science to answer any questions that follow.



- 9 The star Arcturus is classified as a giant star. Which of the following best describes Arcturus?
- A Brighter than most main sequence stars but has a relatively low temperature
 - B Dimmer than most supergiant stars but has a relatively high temperature
 - C Brighter than most supergiant stars and has a relatively high temperature
 - D Dimmer than most main sequence stars and has a relatively low temperature

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- 10** The star 40 Eridani B was the first white dwarf ever discovered. Which of the following best describes 40 Eridani B?
- F** Dim with a relatively high temperature
 - G** Dim with a relatively low temperature
 - H** Very bright with a relatively low temperature
 - J** Very bright with a relatively high temperature
- 11** An astronomer detects a star with a temperature of about 3,000 Kelvin (K) and a luminosity of about 10,000 solar units. Based on the Hertzsprung-Russell diagram, what type of star has the astronomer detected?
- A** A white dwarf
 - B** A giant
 - C** A main sequence star
 - D** A supergiant
- 12** An astronomer detects a star with a temperature of about 15,000 Kelvin (K) and a luminosity of about 1.0 solar units. Based on the Hertzsprung-Russell diagram, what type of star has the astronomer detected?
- F** A supergiant
 - G** A white dwarf
 - H** A giant
 - J** A main sequence star
- 13** The Milky Way, our Galaxy, is classified as a spiral galaxy. A spiral galaxy —
- A** has an undefined shape that is constantly changing.
 - B** is flattened and elongated.
 - C** has a bulging middle and arms that coil outwards.
 - D** is perfectly round.
- 14** A nebula may spin and eventually become a star. A nebula is a —
- F** wavelength of infrared light.
 - G** dense, hot core of molten metal.
 - H** large cloud of dust and gas.
 - J** lump of rock that revolves around the Sun.

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- 15 Our universe contains many black holes. Black holes are most likely to arise from the death of —
- A neutron stars.
 - B white dwarfs.
 - C Sun-like stars.
 - D massive stars.

Use the chart below, to answer question 16.

Types of Stars

Class	Color	Surface Temperature (°C)	Elements Detected	Wavelengths (nm)
O	Blue	Above 30,000	Helium	450
B	Blue-white	10,000 – 30,000	Helium and Hydrogen	480
A	Blue-white	7,500 – 10,000	Hydrogen	480
F	Yellow-White	6,000 – 7,500	Hydrogen and heavier elements	560
G	Yellow	5,000 – 6,000	Calcium and other metals	575
K	Orange	3,500 – 5,000	Calcium and molecules	610
M	Red	Less than 3,500	Molecules	711

8.8C

16. A new star is discovered in the Andromeda galaxy. It is emitting a blue light with a wavelength of 450 nanometers. What element(s) do you expect the star to be composed of?

- A. Helium and Calcium
- B. Helium
- C. Calcium
- D. Helium and Hydrogen

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Use the table below to answer question 17.

Table of Galaxy Data

Galaxy	Distance (light years)	Speed (km/s)
Galaxy A	2,300,000,000	40,000
Galaxy B	70,000,000	1,200
Galaxy C	1,100,000,000	19,000
Galaxy D	900,000,000	15,000
Galaxy E	3,600,000,000	61,000

8.8 D

17. Looking at the data table, which of the following galaxies is closest to the Earth?

- A. Galaxy A
- B. Galaxy B
- C. Galaxy C
- D. Galaxy D

8.8B

18. In what area of the Milky Way is our sun Located?

- A. A
- B. B
- C. C
- D. D

