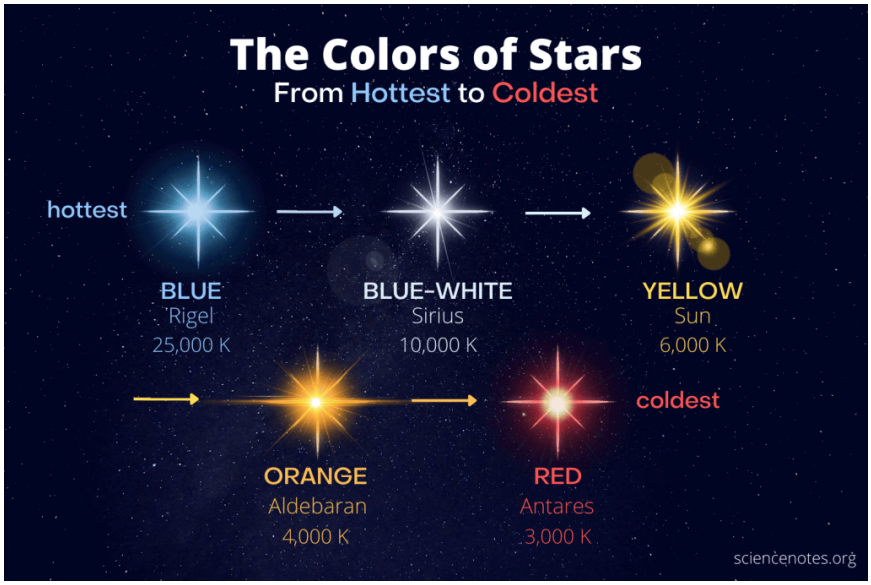
The Birth of a Star

The formation of stars begins in some of the coldest and darkest regions of space. Stars are born deep within ENORMOUS (huge, massive) clouds of gas and dust known as MOLECULAR clouds, which can stretch across hundreds of light-years. These clouds are cold, allowing gas and dust to clump together under the pull of GRAVITY. As the clumps grow, they collide and gather more material, increasing their GRAVITATIONAL strength. Eventually, gravity causes them to collapse inward, heating up the core until a PROTOSTAR, a baby star, begins to form. This glowing young star marks the beginning of light and energy in the universe.

Let's spell: SPACE UNIVERSE ENORMOUS CLOUDS
We are talking about the birth of a ____? STAR
Stars are born deep within clouds of gas and dust known as _____ clouds. MOLECULAR
These clouds are cold, allowing gas and dust to clump together under the pull of _____. GRAVITY
As the clumps grow, they collide and gather more material, increasing their gravitational _____. STRENGTH
Eventually, the core heats up until a _____ begins to form. PROTOSTAR
A protostar is also called a _____ star. BABY
What is the nearest star to Earth? SUN
What galaxy is the Sun located in? MILKY WAY
Give me a synonym for enormous mentioned in the passage. HUGE, MASSIVE
(3B) What kind of regions of space do stars begin to form in? COLDEST, DARKEST
(3B) What clumps together under the pull of gravity? GAS, DUST
Give one word to describe the night sky.
Name one constellation.
If you could name a new star, what would you call it and why?
If you could create your own constellation, what would it look like?

One of the most important stages of a star's life is the main sequence phase. During this time, the star's core becomes hot and dense (thick, heavy) enough for NUCLEAR FUSION, the process where HYDROGEN atoms combine to form HELIUM. This reaction releases energy, heating the star and balancing the inward pull of gravity. Most of a star's lifetime is spent in this stable stage, where its size, brightness, and TEMPERATURE change very slowly over millions or even billions of years. A star's mass determines how long it will remain in this phase — MASSIVE stars burn brighter and hotter but use up their fuel quickly, while smaller stars burn cooler and slower, lasting far longer. Our Sun is currently in the middle of its main sequence stage, steadily shining as it has for about 4.6 billion years.

Let's spell: HYDROGEN PHASE MILLION CORE
The process where hydrogen atoms combine to form helium is called ____ fusion. NUCLEAR
A star's size, brightness, and temperature change very slowly over millions of ____. YEARS
A star's mass determines how long it remains in the main ____ stage. SEQUENCE
Massive stars burn brighter and hotter but use up their ____ quickly. FUEL
The sun has been shining for ____ billion years. 4.6
What is a group of stars forming a pattern in the sky called? CONSTELLATION
Give a synonym for dense mentioned in the passage. THICK, HEAVY
In the stable phase, what characteristics of the star change very slowly? SIZE, BRIGHTNESS, TEMPERATURE
Smaller stars last longer because they burn ____. COOLER, SLOWER
Name one planet known for having rings. SATURN, URANUS, NEPTUNE, JUPITER
Name one organization involved in space exploration.
Name one type of celestial body found in space.
How would you describe Earth to someone who has never seen it?
If you could create a new invention to help space travel, what would it do?



All STARLIGHT is created by the movement of ELECTRIC charges deep within a star. Every charged PARTICLE, like an electron, is surrounded by an electric field that extends in all directions. When these particles move or “shake,” they create ripples in the electric and magnetic fields around them—disturbances (interference, disruption) that we PERCEIVE (recognize, identify) as light. Different FREQUENCIES of these ripples produce different types of ELECTROMAGNETIC waves, from radio waves to visible light. Inside stars, extreme heat and energy cause charged particles to move and collide at incredible speeds—sometimes about 500 trillion times per second, fast enough to produce visible light such as yellow or white. This constant motion of charges is what makes stars shine, filling the universe with light.

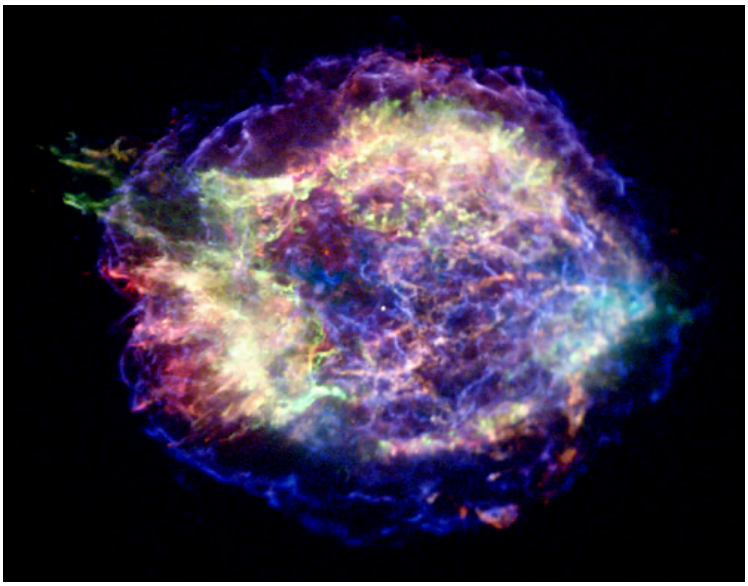
Spell: PARTICLE ELECTRIC WAVES ENERGY
All starlight is created by the movement of electric ____ deep within a star. CHARGES
Every charged particle is surrounded by an electric ____. FIELD
Ripples in electric and magnetic fields are disturbances we perceive as ____. LIGHT
Different _____ of ripples produce different types of electromagnetic waves. FREQUENCIES
The constant motion of charges is what makes stars ____. SHINE
Charged particles move and collide at speeds up to ____ trillion times per second. 500
Give a synonym for perceive mentioned in the passage. RECOGNIZE, IDENTIFY
(3B) Give a synonym for disturbances mentioned in the passage. INTERFERENCE, DISRUPTION
(3B) Charged particles move and collide fast enough to produce what color light? WHITE, YELLOW
Name one country that has sent astronauts to space. UNITED STATES, RUSSIA, CHINA
Name one desert on Earth where scientists test Mars rovers. ATACAMA, MOJAVE
(3B) What do telescopes use to collect light? LENS, MIRROR
Name one object you’d like to see through a telescope.
Name an astronaut who has been to space.

Name one thing you think would be useful in space.
If you were the first person to step on Mars, what would be your first words?
If you lived on a space station for a year, what Earth activity would you miss most?
If you could send a time capsule into space, what item(s) would you include and why?

The Sun is a giant star because it contains nearly all the mass from the cloud of gas and dust that formed our SOLAR system. Its enormous gravity pulled in most of the surrounding material, allowing it to grow far larger than any of the PLANETS that formed from the leftovers. What makes the Sun a true star, rather than just a hot ball of gas, is the nuclear fusion happening deep in its core, releasing vast (huge, boundless) amounts of energy. This energy creates an outward pressure that BALANCES gravity's inward pull, keeping the Sun stable and GLOWING. Its massive size—about 109 times wider than Earth—gives it the power to hold the entire solar system together, providing the light and warmth that make life on our planet possible.

Let's spell: EARTH PLANET BALANCE GAS GROW
The Sun is a ___ star. GIANT
Its enormous gravity pulled in most of the surrounding ____, allowing it to grow larger than any planet. MATERIAL
This energy balances gravity's inward pull, keeping the Sun stable and ____. GLOWING
The sun has the power to hold the entire ___ system together. SOLAR
The Sun is about ____ times wider than earth. 109
(3B) Give a synonym for the word vast mentioned in the passage. HUGE, BOUNDLESS
The sun's size provides ____ that makes life on Earth possible. LIGHT, WARMTH
Name one protective layer that shields Earth from the Sun's energy. ATMOSPHERE, OZONE
Name one natural material that reflects sunlight. WATER, ICE, SNOW
Name a natural event caused by the Sun and Moon. ECLIPSE, TIDE
Name one way sunlight helps living things survive.

Name something that uses solar power.
What is one word that you would use to describe a summer day?
If the Sun could talk, what do you think it would say about Earth?
Why do you think humans have always been fascinated by the Sun?



We need stars because they are the creators and SUSTAINERS of life in the universe. Stars produce the light and heat that make planets HABITATABLE, and without them, Earth would be a cold, dark world. Through nuclear fusion, stars FORGE (create, build) the chemical ELEMENTS that make up everything—from the oxygen we breathe to the iron in our blood. When massive stars reach the end of their lives and explode as supernovae, they scatter these elements into space, enriching future GENERATIONS of stars and planets. Stars also shape GALAXIES with their gravity and energy, guiding the FORMATION of solar systems like our own. In many ways, stars are the universe's engines of creation—without them, neither planets nor life could exist.

Spell: GALAXY CHEMICAL GENERATION LIFE EXPLODE
Stars produce light and _____. HEAT
Stars forge the chemical _____ that build everything. ELEMENTS
When massive stars _____, they scatter their elements into space. EXPLODE
Stars guide the ____ of solar systems. FORMATION
Stars are the universe's engines of _____. CREATION
What kind of scientist studies the stars? ASTRONOMER
(3B) Give a synonym for the word forge mentioned in the paragraph. CREATE, BUILD
(3B) Without stars, Earth would be _____. COLD, DARK
(3B) Stars shape galaxies with ____. GRAVITY, ENERGY
Name one planet that we have explored by robotic spacecraft. VENUS, MARS, JUPITER, SATURN
Name one nocturnal animal.

Name one famous scientist who made an important discovery.
If you could ask one question about the universe and get a real answer, what would you ask?
How does change help the world grow and evolve?