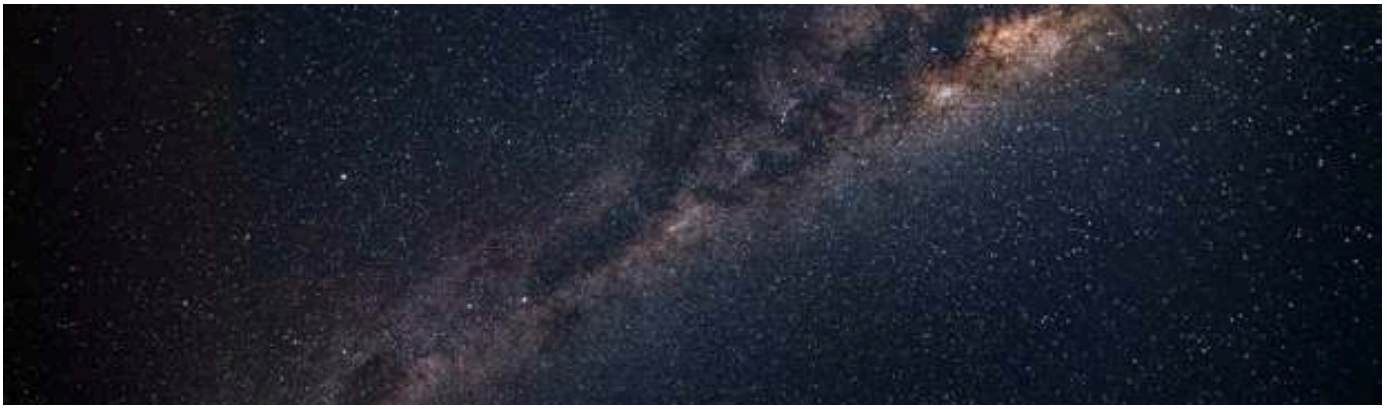


Cosmic Chemistry: How Stars Built You

Reading Worksheet — Level F | tahricteaches.com

Every atom in your body has a story billions of years old. Long before Earth existed, massive stars lived and died in violent **supernova** explosions. These explosions scattered the heavy elements they had forged in their cores — carbon, nitrogen, oxygen, iron — across the galaxy. Our solar system formed from those scattered clouds. And from that material, eventually, came you.

Scientists identify the top five elements in the known universe as hydrogen, helium, oxygen, carbon, and nitrogen — in that order. The human body, remarkably, shares this composition. While helium plays little biological role (it is an inert gas), the remaining four — hydrogen, oxygen, carbon, and nitrogen — make up over 96% of your body mass. The match between cosmic and biological chemistry is not a coincidence. It is evidence of our deep physical connection to the universe.

Astrophysicist Neil deGrasse Tyson has a memorable way of expressing this truth: "We are not figuratively, but literally, stardust." The iron in your red blood cells was forged in the core of a dying star. The calcium in your bones came from **stellar nucleosynthesis** — the process by which stars fuse lighter elements into heavier ones under extreme heat and pressure. Without those ancient stellar deaths, life as we know it could not exist.

This understanding changes how we think about our place in the cosmos. We are not separate from the universe, observing it from the outside. We are part of it, composed of the same raw materials as galaxies and nebulae. When you breathe in, you breathe oxygen forged in stars. When you think, electrical signals travel through carbon-based neurons with a history stretching back 13.8 billion years.

The universe, in this sense, is not just something we look at through telescopes. It is something we carry inside us at all times. Neil deGrasse Tyson puts it simply: "The universe is alive within us, and we are alive within the universe." Understanding this cosmic connection is not just good science — it is, perhaps, one of the most profound things a person can know about themselves.

A. Vocabulary Matching

1. **supernova**
2. **nucleosynthesis**
3. **stellar**
4. **inert**
5. **cosmos**

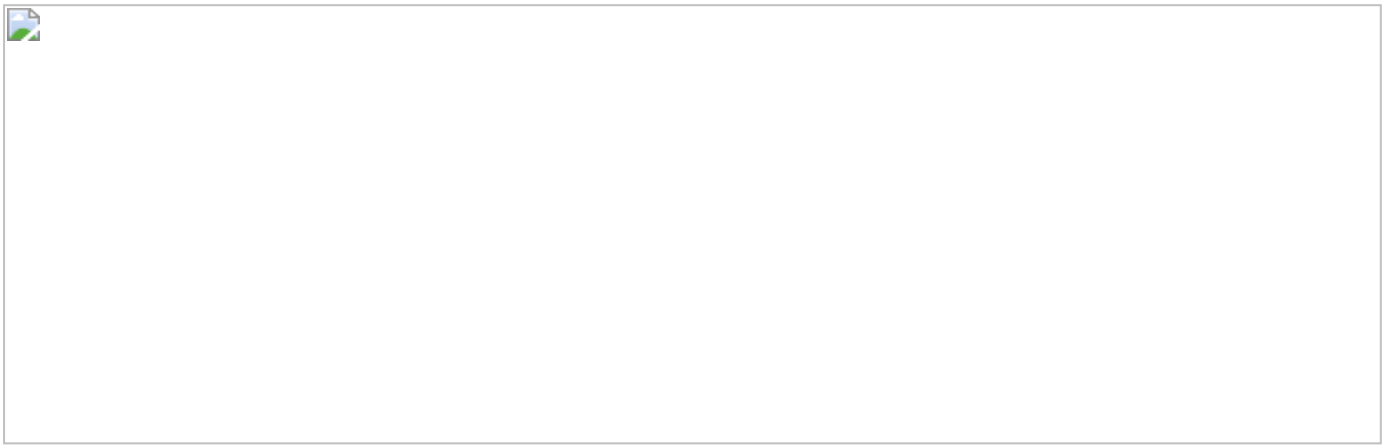
a. a massive explosion that occurs when a giant star dies

b. relating to or involving stars

c. another word for the universe, including all of space and matter

d. the process by which stars create new, heavier elements from lighter ones

e. not reactive; does not easily combine with other elements



B. True or False

1. T F Supernovas scatter heavy elements across the galaxy.

2. T F Helium makes up the largest percentage of the human body.

3. T F The top five elements in the universe include hydrogen and oxygen.

4. T F Stellar nucleosynthesis refers to stars creating new elements.

5. T F The iron in our blood came from ancient stars.

6. T F Humans are completely separate from the universe.

7. T F Over 96% of your body mass is hydrogen, oxygen, carbon, and nitrogen.

8. T F Neil deGrasse Tyson is an astrophysicist.

9. T F Earth formed before any stars existed.

C. Fill in the Blanks

Word Bank: nucleosynthesis supernova stellar cosmos inert

1. A _____ is a massive explosion that happens when a giant star dies.

2. The iron in your blood was created by _____ nucleosynthesis.

3. Helium is _____, meaning it does not react with other elements easily.

4. The process by which stars create new elements is called _____.

5. The _____ contains all space, stars, planets, and matter.

D. Comprehension Questions

1. What is stellar nucleosynthesis, and why is it important for life on Earth?

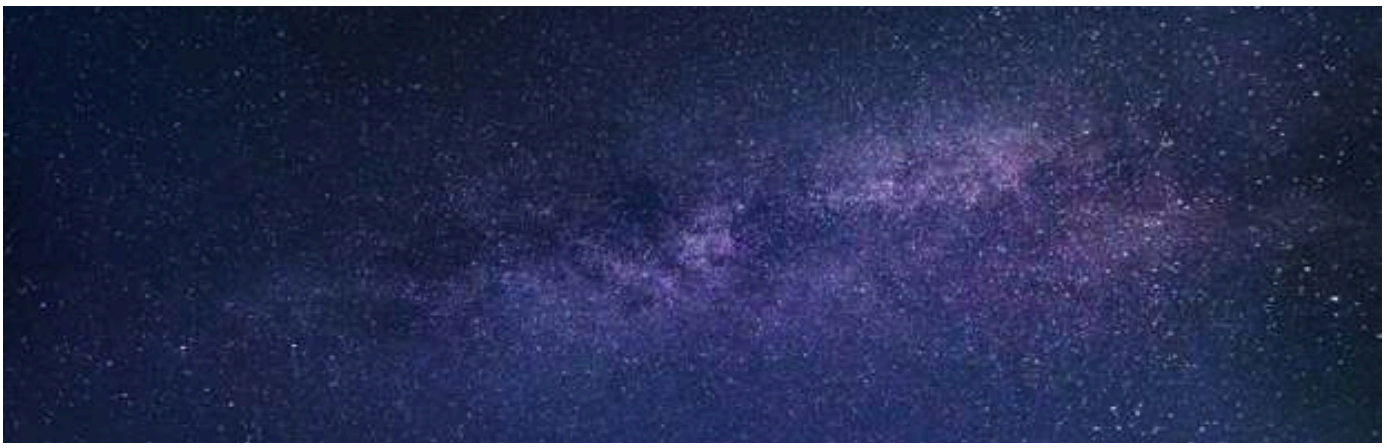
2. Which four elements make up over 96% of the human body, and where did they ultimately come from?

3. How does the quote "The universe is alive within us" reflect the science discussed in the article?

E. Discussion Questions

1. Does knowing that your atoms are billions of years old and came from dying stars change how you see yourself? Explain your thinking.

2. Neil deGrasse Tyson says we are "literally" — not just "figuratively" — stardust. What is the difference between those two words, and why does it matter in this context?



Answer Key

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A. Vocabulary

1-a, 2-d, 3-b, 4-e, 5-c

B. True or False

1-T, 2-F, 3-T, 4-T, 5-T, 6-F, 7-T, 8-T, 9-F

C. Fill in the Blanks

1-supernova, 2-stellar, 3-inert, 4-nucleosynthesis, 5-cosmos

D. Comprehension Questions

1. Stellar nucleosynthesis is the process by which stars fuse lighter elements into heavier ones. It is essential for life because it produced the heavy elements (carbon, calcium, oxygen, iron) that make up living things — without it, only hydrogen and helium would exist.

2. Hydrogen, oxygen, carbon, and nitrogen make up over 96% of the body. They ultimately came from stars: forged in stellar cores and scattered by supernova explosions billions of years ago.

3. The atoms in our bodies literally came from ancient stars, meaning the universe's 13.8-billion-year history is physically inside us — we are not observers of the universe but part of it.