



Wish Upon A Star

Q You're Alpha Centauri, the "star" of our show tonight. We've contacted you through a special series of radio wave relays to talk about why people are so fascinated with space. Could you, er, shed some light on the subject?

A: (inaudible)

Q: What's that? We can't hear you. Please speak up.

A: I said, I'm shouting. It's not easy to be heard from 25 trillion miles away. In other words, 43 trillion kilometers. Or put another way, 4.3 light years. However you want to measure it, it's a long way.

Q: You're trillions of miles away? But your life story says you're the star closest to Earth.

A: Well, that's *almost* true. Your Sun is the star closest to Earth. And Proxima Centauri is actually a fraction of a light year closer than I am. Big deal. In space that distance is SO nothing, believe me. But I'm just about the closest, and I AM the brightest star in the constellation Centaurus. That's why I'm Alpha—after the first letter of the Greek alphabet. Numero Uno. When it comes to brightness, I get an "A."

Q: Well, good for you. But since you are such an expert, would you mind explaining exactly what a light year is? Is it a measure of time or light?

A: A light year is a measure of distance. It's the distance light travels in one year.

Q: But—it doesn't seem as if light takes any time to travel. The Sun shines and we see the sunlight right away.

A: It only seems that way. It actually takes a few minutes for the Sun's light to reach Earth. Light travels at the rate of 186,000 miles per second, and the Sun is 93 million miles away. So do the math. Light is fast, but hey—it can't perform miracles.

Q: You mean to tell us that since you're more than four light years away, it takes four years for your light to reach the Earth? So when we see you shining—

A: You're looking four years back through time. Yep. Amazing but true. And don't forget, I'm one of the closest stars to Earth. Other stars are millions of light years away from you. So when you see them, you're really seeing ancient history in the making. You could be watching a star being born, or dying. Both events happen all the time. Everything has a life cycle, even the trillions of stars up here.

Q: Are there really trillions of stars out there?

A: At least trillions. You can only see about 4,000 of them with the naked eye, but there are over a hundred billion stars in our own galaxy, the Milky Way, alone. Your Sun, the center of your solar system, is just one. And there are 50 billion galaxies, and millions of stars in THEM, and ... Well, you get the picture. I come from a very big family.

Q: Are all stars alike?

A: Yes and no. We're all made of the same elements—helium and hydrogen. That includes your Sun, naturally. But we're different temperatures. I mean, we're all super-hot—after all, that's what gives us our radiant glow. But some stars are hotter than others. And that affects whether we're blue or red or brown or yellow. So does our age.

Q: Do all stars stay together in galaxies?

A: Mostly. But galaxies are just one grouping. Galaxies themselves are kind of clumped into clusters, which can contain up to thousands of galaxies. Within clusters, galaxies orbit each other at about 500 miles per second, held together by gravity. And the clusters are often in superclusters that can be as large as 1 billion light-years across. The Milky Way itself, just one galaxy, is 100,000 light years across. So you get the picture. Space is BIG. But not crowded.

Q: Why not?

A: Because there's so much empty space between us. Scientists think that as much as 95 percent of the universe is huge, empty space. Voids. So imagine how big the whole thing is.

Q: With all those stars, scientists think there are other solar systems up there. Can you tell us how many?

A: Nope. No can do. That's for me to know and you to find out.

Q: Oh, come on. Please?

A: Sorry. Can't. You gotta find out for yourselves. You've only been doing serious exploration, first with small telescopes then more powerful telescopes and now probes and space shuttles and stuff, for about 400 years. That's not even a blink in space time, and you've already come a long way. Give yourselves a little more time.

Q: Why do you think people keep trying to learn more about space?

A: Why not? It is so gorgeous up here. And so big. Endless. There's so much to explore. Room to roam. Earth people like that concept. You know, "Don't fence me in." You guys spent hundreds of years exploring your planet. But that was nothing next to space.

Q: O.K. Let me just ask you outright: Is there anybody up there?

A: Won't answer. Can't tell. That would take all the fun out of it for you. But I will tell you this: the universe is in a constant state of change. Stars are born and stars die all the time. And any one of those stars could theoretically be the center of a solar system, just like your Sun. So any one of those theoretical solar systems could be like yours. Or very different.

Q: So there could be thousands of other solar systems. Maybe millions. Meaning thousands or millions more planets like Earth. Maybe with people like us on them.

A: Yep. Or there could be different planets with different life forms. LOTS of different life forms. So someday you'll have more answers—but never all the answers. That's why you'll always want to keep exploring.

Activity

GET ON BASE Scientists think a lunar base could be established early in the twenty-first century for further exploration of the Moon. What clues would you look for to figure out the Moon's history? Think of atmosphere, water, land formations.