



CREATION ASTRONOMY for KIDS

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CHAPTER 1

WHAT'S IN THE SKY?

THE UNIVERSE: A HUUUUUGE PLACE

People have always been fascinated by the night sky. They have wondered about the many bright lights out there, and what they really were. And they noticed patterns that helped them make the calendar. Later, they noticed that they could use slight movements of the stars to figure out how far away they were. This led to new kinds of math and even branches of science! *Astronomy* is the study of outer space and the objects in it, and the people who do this are called *astronomers*.



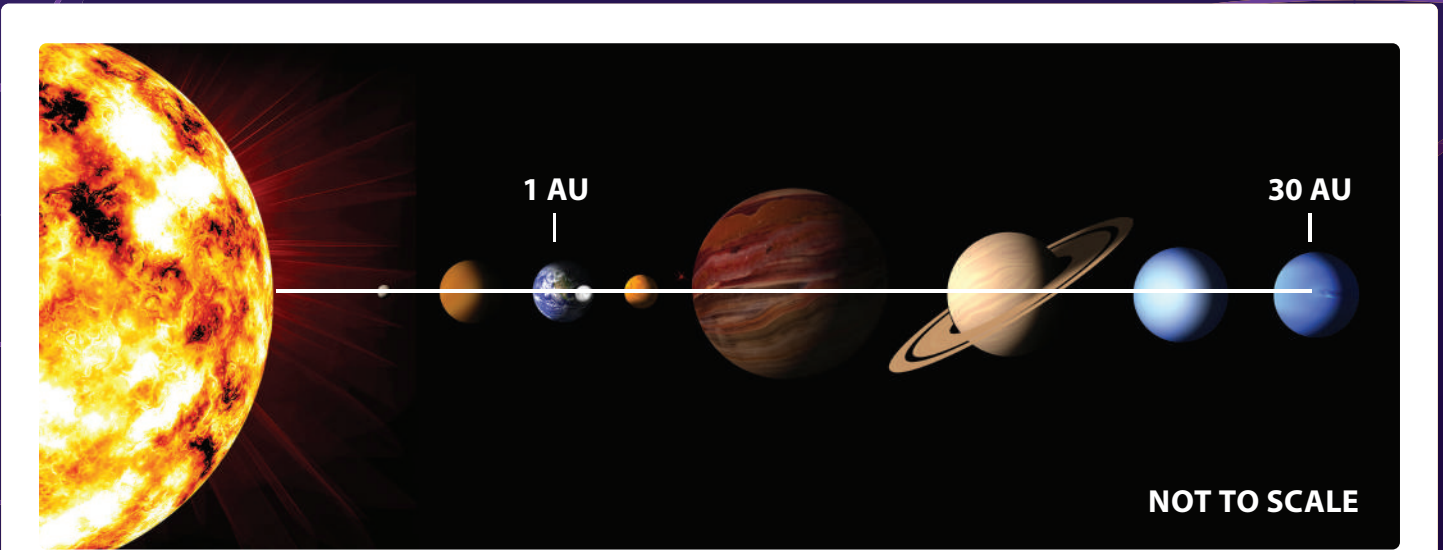
The enormous universe

The universe is made up of space and all the objects in it. The study of the universe as a whole is called *cosmology*. The universe is so big that it's hard to describe.



Earth

Let's start with our own planet, the earth. For at least 2,500 years, we have known that this is a huge ball. How huge? Eratosthenes, a Greek astronomer living in Egypt about 200 years before Christ, worked this out! He came very close to what we now know is the right size: 12,742 km (7,917.5 miles) in diameter.



Moon, sun, and planets

The earth seems big, but the distance from Earth to the moon is about 30 times larger (see illustration above on the next page). The distance to the sun is 400 times larger still, around 150 million km (93 million mi.). To help with communicating even

larger distances, astronomers call the distance from the earth to the sun an *astronomical unit* (AU). Thus, Earth is 1 AU away from the sun. The furthest planet from earth, Neptune, is 30 times further away from the sun than we are, or 30 AU.



Earth

Distance and size of the earth and moon, to scale

Stars and light years

But the distances to the stars are even greater. The closest star to the sun is called Proxima Centauri, which is about 9,000 times further than the distance between Earth and Neptune. The distances are now too big to use AU. Instead, astronomers often use another unit called a *light year* (ly).

A light year is the distance light travels in a year—light is SO fast that it travels 300,000 km (186,000 mi) every second. So light travels very far in a year: about 9 trillion km (5.6 trillion miles)!

This makes it easier to talk about the distance to the stars. That is, Proxima Centauri is about 4.3 ly.

The brightest star at night, Sirius, or the ‘dog star’ is 8.6 ly. And a bright red star in the constellation Orion, Betelgeuse, is about 640 ly.

However, there are objects that are even much further away than that. The most powerful telescopes can see galaxies, vast collections of stars, from over 13 billion ly away.

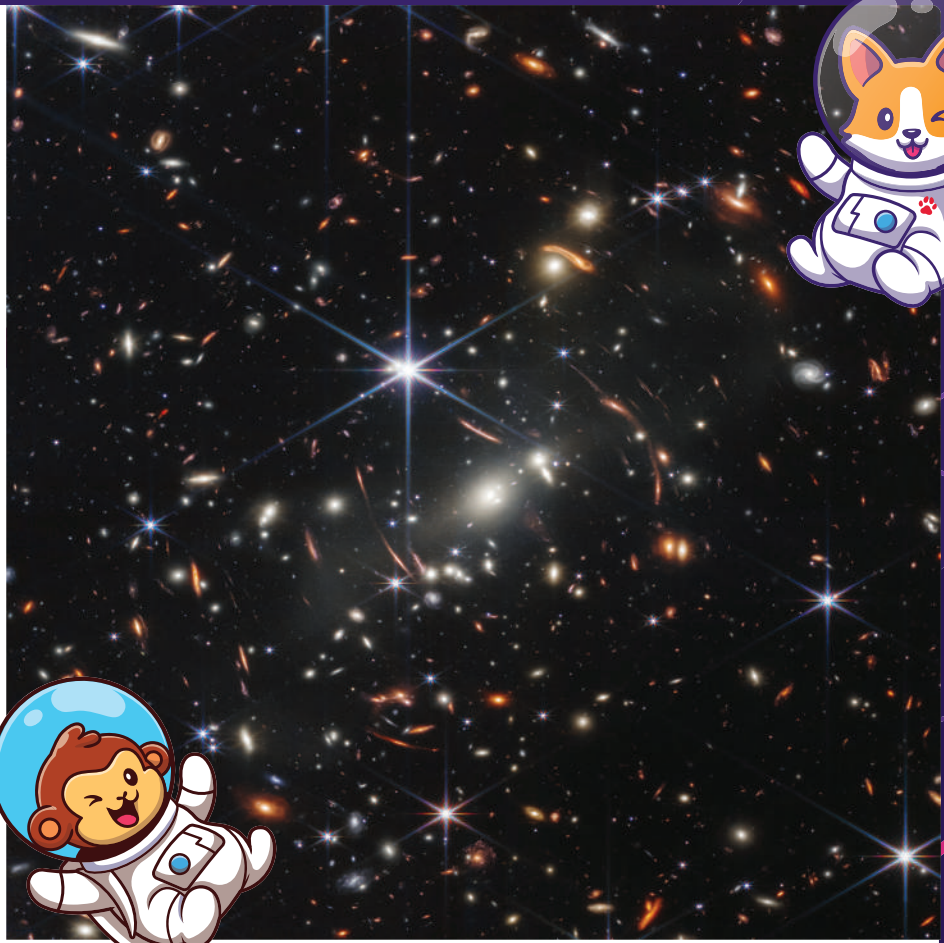
Memory verse: *The heavens declare the glory of God, and the sky above proclaims his handiwork (Psalm 19:1).*

How can we see stars that are very far away?

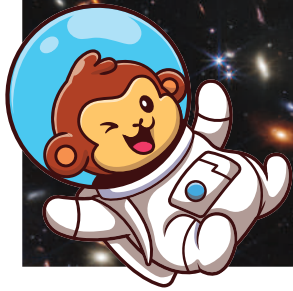
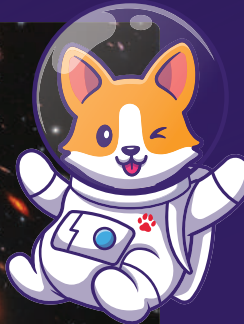
We noted that the very furthest stars are billions of light years away. But the Bible tells us that God created 6,000 years ago. How can the light from stars reach us from farther than 6,000 light years if it didn’t have the time to go that far? Some very smart scientists think that when God created the stars, the universe was still stretching out, so that the light didn’t have to start that far away.

Why would God make such a big universe?

The universe is big to us, but it isn’t big to God! He is so powerful that it wasn’t hard for Him to make the universe very big. The stars and planets bring God glory and they give us a lot to investigate and explore! **LOOK UP: PSALM 8**



Galaxy cluster SMACS 0723 containing thousands of galaxies. Infrared image from NASA’s James Webb Space Telescope.

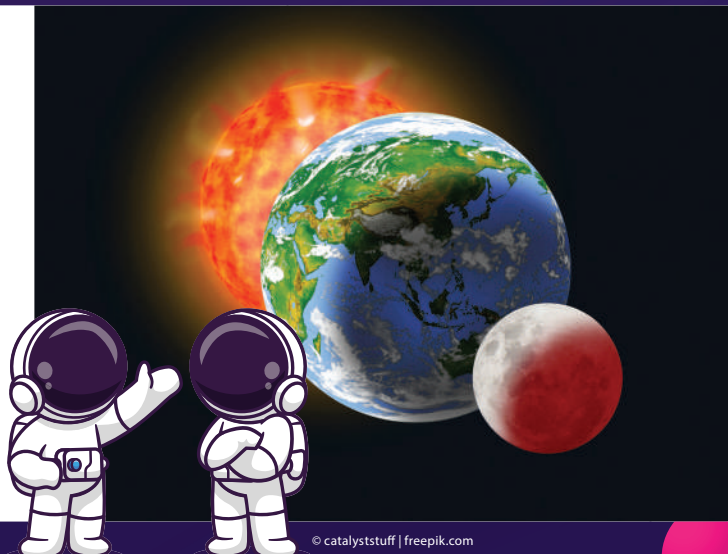


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How and when the universe began

The Bible tells us how the universe began. Genesis tells us that God created “the heavens and the earth” (1:1). But God waited until Day 4 to create the sun, moon, and stars.

Genesis calls the sun “the greater light”, the moon “the lesser light”, and doesn’t say much at all about the stars. That’s because a lot of people used to worship the lights in the sky. So God wanted to make it clear that they were created objects, not things to be worshiped.



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Science Experiment

How can you measure distances without a very long tape measure or yardstick? The answer is based on how objects appear to change position when you view them from different positions. This is called *parallax*.

You can see this for yourself. Hold one index finger far behind the other. With one eye, look through them both at something in your yard. Now move your head from side to side. Both fingers should appear to move in the opposite direction to your head. But the furthest one should move the least.

Then try this with one finger and two objects in your yard, one much closer than the other. You should see the least movement in the furthest object.

This works in astronomy too. The point is, parallax in stars is so tiny that no one could even see it until scientists invented powerful telescopes in the 1700s. This is how ancient astronomers knew that the stars must be extremely distant because they couldn’t even detect the parallax. (You can even work out the distance from parallax. But this takes a type of high school math called *trigonometry*, first invented by astronomers.)

CHAPTER 2

HOW DID EVERYTHING START?

People have always wondered how the universe began. Some ancient people had stories about how the earth was formed from a war between false gods. Today, some scientists tell us that everything began with a 'big bang' billions of years ago. But how do we know how the universe really began? God tells us in the Bible how He created the world. Only the Creator can give us a true account of how He made everything.