



CARING FOR GOD'S EARTH

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The Story of the Universe

The story of the universe is about 13.7 billion years long.

The universe exploded into being. Everything in the universe has its origins in this 'big bang'. As the young universe cooled quickly, atoms formed. Atoms clumped together and became matter. Matter clumped together and became suns. Suns exploded and became new suns, planets, satellites and moons. Eventually, suns, planets, satellites and moons became galaxies.



If 1km = 1year, it would take about 340 000 trips around Earth's equator to cover the 13.7 billion years since the 'big bang'.



The universe is constantly changing.

Telescopes, like the Hubble Telescope, have helped scientists and mathematicians to read the story of the universe. As Christians, we believe that God loved the universe into being and waits in delight as the heavens, the stars, Earth—and all that is—bring light and life to the story.

Event	Billions of years ago (10^9)	Millions of years ago (10^6)	Years ago (10^1)
Big bang	13.7	13700	13700000000
Milky way galaxy forms	10	10000	10000000000
Formation of our sun	4.59	4590	4590000000
Formation of our solar system	4.5	4500	4500000000
Earth's surface unstable	4.1	4100	4100000000
Igneous rocks	3.8	3800	3800000000
First living cells	3.8	3800	3800000000
Blue green algae	3	3000	3000000000
Stable planet surface	2.8	2800	2800000000
First ice age	2.48	2480	2480000000
Soft bodied water organisms	0.58	580	580000000
Glacial extinction	0.65	650	650000000
Trilobites	0.534	534	534000000
First backbones	0.44	440	440000000
Vegetation on land	0.47	470	470000000
Creatures on land	0.41	410	410000000
Trees	0.305	305	305000000
Reptiles	0.31	310	310000000
Mammals	0.205	205	205000000
Dinosaurs	0.248	248	248000000
Flowering plants	0.21	210	210000000
Birds flying	0.14	140	140000000
Demise of dinosaurs	0.065	65	65000000
Marsupials	0.045	45	45000000
Primates	0.06	60	60000000
Whales	0.055	55	55000000
Horses, camels	0.045	45	45000000
Elephants	0.033	33	33000000
Deer	0.025	25	25000000
Giraffes	0.02	20	20000000
First hominin	0.0065	6.5	6500000
Homo erectus	0.002	2	2000000
Homo sapiens	0.00019	0.19	190000



I wonder how telescopes work and who invented them.

I wonder how big a billion is.

I wonder what will happen to our sun and solar system.

I wonder how God started the universe and I wonder what existed before the 'big bang'.

The Story of Ear

The story of Earth is one chapter of 'The Story of the Universe'.

The Earth is formed from the same stardust as our sun.

Geologists think Earth is about four and a half billion years old. At first, Earth was a ball of molten rock and gas.

Over time, the planet cooled and the heaviest elements, such as iron, moved towards the Earth's core. Lighter elements and gases continued to cool and formed large masses of solid rock and liquid water on the Earth's surface. The first living cells emerged before the Earth had an oxygen-rich atmosphere.

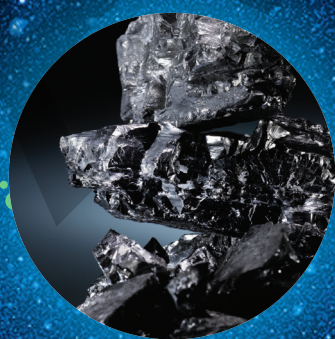
A geological and biological timeline of Earth's story



4.6 BYA
Formation
of our solar
system

4.5 BYA
Formation of
Earth

4.45 BYA
Earth's moon
forms



300 MYA
Forests of Europe, Asia and
North America become
fossilised as coal

275 MYA
First pine
trees

260 MYA
End of ice age

150 MYA
First birds

133 MYA
Meteor
impacts
Australia

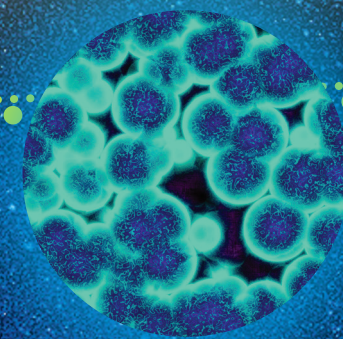
60 MYA
First hoofed
animals



50 MYA
Himalayas
begin to form

45 MYA
Australia
separates from
Antarctica

3.8 BYA
Earth's surface cool
enough for masses
of rock to form



3.5 BYA
First living cells

2.5 BYA
Oxygen
added to the
atmosphere

310 MYA
First reptiles
and giant
arthropods

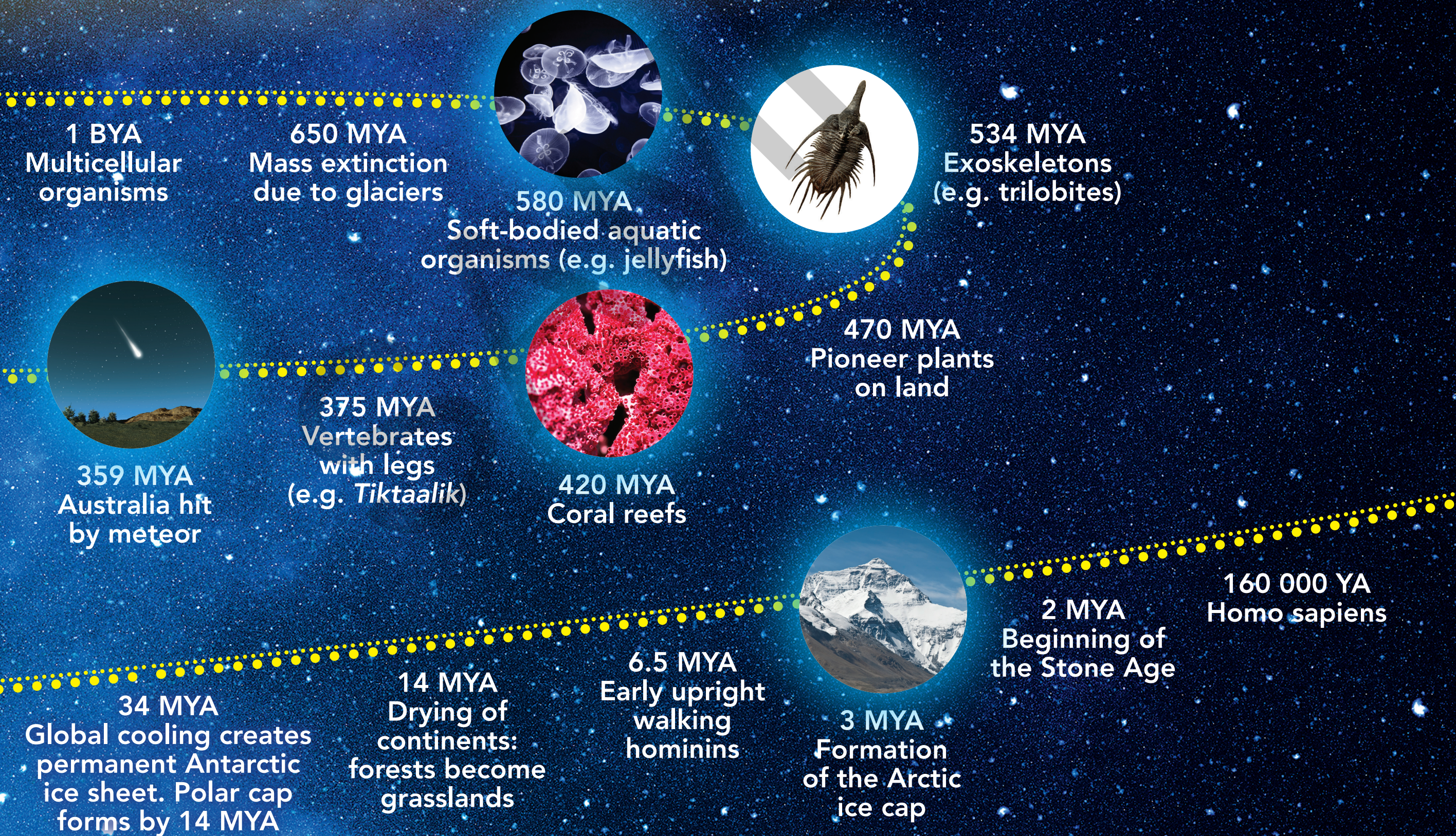
318 MYA
Egg laying
animals

350 MYA
Ice age

*BYA: Billions of Years Ago *MYA: Millions of Years Ago *YA: Years Ago



During the last three and a half billion years, there have been many geological and biological changes. The study of geology helps to describe the changes in the shape and composition of the Earth's surface. Biological changes show the history of life since the first single cell to the diversity of life forms we see today.



I wonder what the key biological changes in Earth's story are.

I wonder what some of the geological changes have been.

I wonder how geologists and biologists have come to know Earth's story.

I wonder how we can help God look after our Earth.

Glossary

Adaption/adapting: over very long periods of time, the physical being and/or the behaviour of organisms change. Those changes that best suit a particular organism's environment help it to survive.

Arthropod: segmented invertebrate (without a backbone) creatures, like insects, spiders and crabs.

Biodiversity: bio means life. Diversity means variety or mixture. Biodiversity means the mixture of life forms present in the environment.

Deforestation: the removal or destruction of forests, usually the result of clear-felling—cutting down all the trees.

Degradation: refers to the reduced quality of the natural environment e.g. degraded soils will be less fertile and produce less vegetation or crops.

Desertification: the process of the landscape becoming like a desert.

Environmental refugees: people forced from their traditional lands because of the destruction of the environment. They may be forced to leave their lands because of lack of food, fresh water, rising sea-levels etc.

Evolution: a process in which an organism changes through a variety of stages into a more advanced, complex or mature stage over a very long period of time.

Feral: domestic animals that have become wild animals, either because they have been released into the wild or they have been born in the wild. These animals compete with the native species and are often destructive to the natural environment. Examples of feral animals include donkeys, camels, water buffalo, goats, wild dogs and wild cats.

Genre: type or style of story, either written or spoken. For example, stories which teach the listener about their place in the world, how the world came to be and who made the universe, belong to a genre known as the cosmological.

Habitat: where one lives or the natural environment of particular organisms.

Hominin: an early ancestor—or evolutionary stage—of human beings.

Homo: Latin, meaning human.

Indigenous: originating in a particular area and identified particularly with that area.

Inuit: indigenous people of Greenland, northern Canada, Alaska and north-eastern Siberia.

Molten rock: molten means in melted or in liquid form. Molten rock is in liquid form due to extreme temperature.

Monoculture: mono means one. Culture refers to the type of plant. Monoculture refers to the planting of single crops on a large scale, e.g. thousands of hectares of cotton or canola.

Overfishing: to remove so many fish from the ecosystem that remaining fish cannot reproduce or maintain the balance with other organisms.

Salinity: refers to the level of salt present in the soil or water.

Seasonal variation: the changes that occur with each season, such as length of day and night, temperature, humidity, prevailing winds, ocean currents and precipitation—dew, rain, hail, snow.

Trilobites: group of extinct arthropods with flat, oval bodies.

Urban drift: the movement of people from rural and farming locations to the big cities and towns.

Vertebrate: creatures that have a backbone or spinal column, like lions, sharks and humans.



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