GLOSSARY

altruism – Unselfish concern for others (which may involve self-sacrificial acts).

Anthropic Principle – The idea that the universe has been finely tuned to allow for the existence of life. (See also *fine-tuning.*)

anthropo – A Greek prefix meaning "having to do with humans."

antimatter – Has the same physical properties as matter (e.g., mass) but the opposite electrical charge. For example, the antimatter equivalent of an electron is a "positron," which has positive electric charge. When matter and antimatter come together they annihilate, giving out a lot of energy in the process.

astrophysicist – A scientist who uses the laws and theories of physics to study stars and other celestial objects.

astrophysics – The branch of astronomy that studies stars and other objects in space, using the laws and theories of physics.

atheist – Someone who believes that no gods exist.

automata – Machines that direct themselves according to preprogrammed instructions.

bacterial flagellum – A long "tail" that bacteria use to propel themselves around, rather like an outboard motor.

Big Bang – The current scientific understanding of the origin of the universe. Many Christians believe that the Big Bang is compatible with the Genesis account. The Big Bang was the beginning of the expansion of the universe from its initial hot, dense state, and it is still proceeding (the expansion is actually accelerating). Space is expanding at the same rate in all directions.

biochemistry – The study of the chemistry of living things.

bioethics – The moral principles that govern medical and biological research. (See also *ethics.*)

biology – The study of living things.

bottom-up – The effect that the "building blocks" of an object have on its overall properties (e.g., bricks make a strong house). (See also *top-down.*)

British Meteorological Office – Known as the Met Office, this is the UK's national weather service.

Cambrian – A geological term for the period of time from about 542 to 488 million years ago during which there was a large increase in biological diversity in the fossil record.

camera eye – The type of eye that humans and many other animals have. It works in a similar way to a camera, including a lens, iris, and detector.

caveat – A warning or exception.

cell – The unit that makes up a living thing. Animal cells consist of a membrane enclosing whatever components that particular type of cell needs to do its job. For example, a fat cell contains fat, a bone cell contains a hard substance, a red blood cell contains a substance that carries oxygen around the body, and the long spindly nerve cells are able to pass electrical signals along their length.

chromosome – Each DNA strand in a living cell is wound up tightly into a chromosome. Depending on how human chromosomes are processed in the lab, they can sometimes look like "x" shapes or pairs of striped socks.

climate change – A significant and long-term change in the weather patterns of the planet.

cloning – Creating a genetically identical copy of a living organism by replacing the nucleus of an unfertilized egg cell with the nucleus of an adult cell.

cognitive ability – The ability to think and experience things.

commodification – The treatment of something as a mere product that can be bought and sold. For example, slavery is a commodification of human beings.

complementary – A word to describe things or ideas that combine in such a way as to enhance each other.

conception – The act of conceiving a child (creating an embryo by fertilizing an egg).

concord – Agreement, harmony.

congruent – In agreement.

conjecture – An idea based on incomplete information.

constants (physical) – Numbers that are important to the scientific understanding of physical and chemical processes which have been discovered through experiment. These numbers do not change (they remain constant). There seems to be no obvious reason why physical constants should be set at certain values, but in this universe they just are (e.g., an electron always has the same charge).

convergence – see *evolutionary convergence*

correlate (verb) – To relate in such a way that one thing affects or depends on another.

cosmologist – A scientist who studies the origin, development, and overall shape and nature of the universe.

cosmology – The study of the origin, development, and overall shape and nature of the universe.

dark energy – A hypothetical energy associated with the fabric of space, which could be the force that increases the expansion of the universe.

dark matter – Hypothetical matter which makes up around 22% of the mass of the universe. Dark matter is thought to have mass but no electric charge, making it very difficult to detect. The nature of this matter is disputed: some say it is made up of massive subatomic particles.

Darwinism – The theory of the evolution of species by natural selection, based on the ideas of Charles Darwin (1809–1882).

deism – The belief in a supreme being which created the universe but has then had no further involvement with it.

delegate (verb) – To entrust a responsibility to someone else.

determinism – The belief that things/forces outside ourselves determine all events, including our actions. This belief can imply that individuals have no free will and are not morally responsible for their actions.

developing country – A financially poor country, usually dependent on agriculture, which is becoming more advanced economically and socially.

DNA – The chemical molecule (or strand) inside every cell of every living organism that carries the instructions for that organism's growth and development.

doctrine – A set of teachings and beliefs.

early church fathers – The theologians in the early centuries of Christianity who wrote down the various doctrines found in Scripture and explained them.

ecology – The branch of biology that studies the relationships of species to one another and to their environment.

elements (chemical) – The basic building blocks of everything on earth. The elements include hydrogen, helium, oxygen, carbon, and beryllium.

embryo – An unborn human, especially in the first eight weeks after conception (after the fertilized egg has implanted into the wall of the womb, but before all the organs have developed). (See also *fetus*.)

emerge – To move out of something and become visible.

emergence – The idea that complex structures have properties that you couldn't predict if you looked at their individual parts.

empirical – Observed or based on experiment.

enigma – Something that is mysterious or difficult to understand.

epiphenomena – An effect which arises from a process; a side effect.

epistemology – The theory of knowledge – especially with regard to our methods of gaining knowledge, how we test whether knowledge is valid, what the limits of our knowledge are, and the distinction between justified belief and mere opinion.

ethics – Moral principles that govern a person's behavior. (See also *bioethics.*)

evolution – Often used to simply mean change over time. Evolutionary theory in biology refers to the changes in living things that occur over long periods of time and eventually result in new species.

evolutionary convergence – The idea that, because of conditions in the natural world (see *constants* and *Anthropic Principle*), evolutionary processes find similar solutions to similar problems, so certain characteristics of living things have evolved many times, independently of each other (e.g., the camera eye).

Evolutionary Creationism – see *Theistic Evolution*

extrapolate – To extend an idea to a future situation by assuming that existing trends will continue.

fall, the – The biblical account of how people began to disobey God.

fertilization – The action or process of fertilizing, in which male reproductive material is introduced to female reproductive material, leading to the development of a new individual (whether plant or animal).

fetus – An unborn human being, more than eight weeks after conception. (See also *embryo.*)

fideistic – Something that is based solely on faith or revelation, ignoring reason or intellect.

figurative – Not a literal use of words; metaphorical.

fine-tuning – The idea that the physical constants of the universe are set at the precise values necessary for the existence of biological life. (See also *Anthropic Principle.*)

gene – A unit of heredity which is transferred from a parent to offspring and determines some characteristic of the offspring. Found in the nucleus of a cell, the gene forms part of a chromosome.

genealogical – Relating to the study of family descent. A genealogical record traces the lines of a family tree.

genetics – The study of inherited characteristics and the variation of inherited characteristics among populations.

genre – A style or category of art, music, or literature.

geologist – A person who studies the physical structure and history of the earth.

germ cells – Eggs and sperm.

gluon – see *quarks and gluons*

God of the gaps – An argument which says that when we can't explain something in nature scientifically, that is proof that God exists.

God Spot, the – The place (or network of places) that is active in the brain when someone is having a religious experience. Some reductionists say that this religious experience is simply a side effect of other processes in the brain that makes someone feel that God exists.

hermeneutics – The branch of knowledge that studies how we interpret the Bible and literary texts.

holistic – Having to do with the whole person; characterized by the belief that the parts of something are intimately interconnected to the whole.

Human Genome Project – The international project to "read" the whole of the human DNA code (the genome).

hypothesis – An explanation of phenomena made on the basis of limited evidence, as a starting point for further investigation. (plural *hypotheses*)

ideology – A system of ideas, especially one which forms the basis of economic or political policy.

implantation – The attachment of the fertilized egg, or blastocyst, to the wall of the womb at the start of pregnancy.

inorganic molecules – Molecules which do not contain carbon. Plants turn carbon dioxide (CO_2) into organic molecules, and all organisms are capable of mixing these with "inorganic" elements to make new "organic" molecules.

Intelligent Design (ID) – The idea that some parts of living things are too complex to have evolved, coupled with the idea that the information contained in DNA cannot have arisen by any unguided material process, so providing evidence for "design."

irreducible – Not able to be simplified.

irreducibly complex – Something which could not have evolved from simpler precursors (in Intelligent Design).

IVF (*in vitro* fertilization) – A method by which an egg is fertilized by a sperm cell outside the mother's body (*in vitro* means "in glass," since this procedure originally occurred in test tubes or on petri dishes). IVF is a common method of helping couples conceive a baby who are not otherwise able to conceive.

Jurassic – A geological term for the period of time between about 199 and 145 million years ago.

laws of nature – Descriptions of the way things behave in nature (e.g., Boyle's law describes the behavior of gases under certain conditions).

malignant – Bad or harmful, often used with regards to cancer; the opposite of benign (harmless).

mandate – An official order or commission to do something.

materialism – The belief that nothing exists except matter.

materialist – Someone who believes that nothing exists, or is important, except the material world.

mechanism – The process by which something takes place or is brought about.

mechanistic – Relating to theories that explain everything around us based on a merely physical or deterministic worldview.

metaphor – A figure of speech in which a word or phrase draws a comparison between seemingly unrelated things by asserting that they are the same, though this is not literally the case.

metaphysic – Any particular way of interpreting the world.

metaphysical –Philosophical or abstract ways of thinking that are impossible to test by experiment.

methodological reductionism – Studying an object by breaking it down and looking at its parts.

model – A simplified description of a system or process, developed in order to assist calculations and predictions.

molecular biology – The study of biology at a molecular level, especially DNA and the cellular machinery that makes proteins.

multicellular – An organism made up of more than one cell. (Bacteria are "unicellular.")

multiverse theory – The idea that there are multiple universes. Some people use this theory to argue that if there are many universes, it is not so surprising that one of them is "fine-tuned" for life.

muscular dystrophy – An inherited condition that involves weakening and wasting of the muscles over time.

mutation – A change in the DNA code that occurs during the life cycle of a living thing. Mutations can be caused by a toxic chemical or other environmental disturbance, or by a mistake in copying the DNA when new cells are made.

NASA – The National Aeronautics and Space Administration, an agency of the US government responsible for the US space program.

naturalistic – Something explained with reference to the natural world only, with no allowance for a supernatural explanation.

Near East, the – A term archaeologists and historians use for the Middle East.

nervous system – The network of nerve cells which carries nerve impulses to different parts of the body.

neural correlate – The physical state of the brain associated with a mental state or thought.

neurons – The "nerve cells" that carry messages in the nervous system and the brain.

neuroscience – The study of the brain and nervous system.

nihilism – Lack of belief in morality or meaning in life.

order of magnitude – Most commonly used to mean ten times larger (e.g., 5,000 is two orders of magnitude larger than 50).

paleontologist – Someone who studies fossils.

parallel universes – Other universes that exist at the same time as the one we see (this is important for some forms of multiverse theory).

particle physics – The study of the tiny particles that make up atoms.

phenomenon – A fact or situation that is observed to exist or happen; an observable event. (plural *phenomena*)

pre-implantation genetic diagnosis – DNA testing of IVF embryos.

precursor – Something that comes before another thing of the same kind; a forerunner.

primitive streak – The faint streak which is the earliest trace of the developing embryo in the fertilized egg.

principle – A general scientific theorem or law.

prosthetic – Relating to an artificial body part.

quantum mechanics – The principles underlying the fundamental laws of physics, such as the dual wave-like and particle-like behavior of matter and radiation.

quarks and gluons – Subatomic particles. Gluons are particles thought to bind quarks together to form larger particles such as protons and neutrons.

radiometric dating – If you measure the amount of a specific radioactive chemical (isotope) present in something, you can calculate its age based on two things: 1. The half-life of that radioactive chemical: after a specific amount of time (the half-life), half of the original radioactive isotope atoms will have broken down into other elements. 2. The amount of the isotope that would have been present when the object was formed. It is possible to calculate this through other means. So if you know how much of a certain isotope is left in the sample, you can calculate how old it is.

reductionist – Someone who thinks that you can explain anything by reducing it to its most basic physical properties.

resonance [in the origin of carbon] – Several more basic atomic building blocks can react together to form a new element. If the combined energy of the nuclei that are crashing together is just greater than the resonance level (or nuclear energy level) of the resulting nucleus, the reaction is more efficient. It is this effect that made it possible for carbon to be formed.

Schrödinger equation – An equation that describes the behavior of the tiny particles that make up atoms. It describes how a quantity called the wave function changes with time. The probability that a measurement will give a particular result is derived from the wave function.

sedimentary rock – Rock formed by laying down and compressing layers of sediment (dust, ash, sand, etc.).

somatic cells – All the cells in the body except eggs and sperm.

special relativity – Einstein's theory about space and time: the speed of light in a vacuum is the same for all observers.

synapse – A tiny gap between two nerve cells across which nerve impulses pass.

tectonic plates – Rigid structures which make up the earth's outer crust. They float on top of a layer of magma (molten rock). They separate, collide, and rub against each other, causing volcanoes, earthquakes, and tsunamis. They also allow nutrients, minerals, and gases from the interior of the earth out onto the surface and into the atmosphere.

theism – Belief in a personal God who created the world and who also sustains and continues to be involved in it.

Theistic Evolution (or *Evolutionary Creationism*) – The belief that God created life through the process of evolution.

theology – The study of God, his attributes, and his relationship to the world.

top-down – The effect an object or whole has on the parts of which it is made. (See also *bottom-up.*)

transcendence – Existence or experience beyond the physical level.

transhumanism – The desire to enhance human abilities with technology in extreme ways.

vertebrates – Animals with a spinal cord: amphibians, birds, fish, mammals, and reptiles.

Young Earth Creationism – The belief that Genesis should be interpreted as a literal, historical, and scientific account, and therefore that God created the world between 6,000 and 10,000 years ago in six twenty-four-hour days.