

## Topic 2.4 Science and religion in dialogue

### Procedure

*the understanding of creation in either the Buddhist, Christian, Hindu, Islamic or Jewish tradition.*

e.g. In Christianity the religious doctrine of Creation supplies the theological context for many questions concerning the relationship between religion and science today.

Read Student Work: *Student Work: CREATION – THE COSMIC CLOCK*

Discuss: How does the “the cosmic clock” image differ from a religious view of creation?  
Are there any similarities between “the cosmic clock” and a religious view of creation?

Take feedback and highlight how modern science sees the whole universe as emerging through the processes of evolutionary change, from the initial Big Bang to complex living things. Biological evolution is the scientific theory that all organisms, all living things, are related by common descent. Evolution means that there is a great multiplicity and diversity of species because organisms change from generation to generation and in different ways.

Read *Student Work: SCIENCE AND RELIGION IN DIALOGUE*

Discuss: What do the words of Pope John Paul II’s show about his understanding of the relationship between science and religion?

Read Student Work: *STORY OF CREATION GENESIS 1– 2:4*

Take feedback and highlight how a close reading of Genesis suggests humans are stewards of God’s gift of creation and are entrusted with responsibility for the environment. Theology encourages an ethic of stewardship as opposed to an ethic of domination. God is seen as the origin, ground and goal of the universe. The Christian understanding of Creation emphasises:

- The transcendence of God and the gap between Creator and creation i.e. creation out of nothing, preserves the sovereign freedom of God who, out of love, wills to create something other than God’s self.
- The presence of God and the close relation between creation and the Creator i.e. the absolute dependence of the universe on God. Focuses on God’s continuing and conserving presence that sustains the world in existence.

Read *Student Work: Genesis on Trial*

“Inherit the Wind”, a well-known play by Jerome Lawrence and Robert Lee, is based on this Tennessee trial. The play ends with Darrow packing the Bible and Darwin's *Origin of the Species* side by side in his suitcase, as he prepared to return to Chicago.

Discuss: Do you see any symbolism in packing the two books side by side?"

The Parable of the Good Samaritan contains truth (everyone is my neighbour), but it does not contain fact (the event described is fictional)

- I Do you think the story of creation, as it appears in the Book of Genesis, could be a kind of parable'?
- I Did the biblical writer intend it to communicate religious truth without necessarily relating historical fact?"

*For higher level only – a contrasting understanding of creation from another religious tradition*

e.g. In the Islamic tradition the religious doctrine of Creation also supplies the theological context for many questions concerning the relationship between religion and science today.

Read Student Work: *Student Work: ISLAMIC CREATION STORIES*

Take feedback and highlight how the aim of Islamic science is to show the unity and interrelatedness of everything, so that in reflecting on the unity of the cosmos people will be led to the Divine Principle of Unity.

- Both the Qur'an and the natural world speak of the power of the Almighty and the divine Unity. The story of creation in the Qur'an is very similar to Genesis in that the world is created in six days. Islam, like Christianity, believes that God brought the whole world into being out of nothing. Creation has its origins in the absolute goodness of Allah, the 'Beneficent', who freely creates this particular world with its unique features and laws. Everything in creation is obedient to the will of God and he controls the universe through his eternal commands. The doctrine of the oneness of God Tawhid (oneness) meaning 'being one' or 'making one' is central to the Islamic understanding of the universe. God's commands that govern the world go out from him, achieve their purpose, and return to him.
- The Islamic principle of unity-in-multiplicity resonates with much modern science in organisms, in natural systems and in the rational unity of the cosmos. It is a refusal to see any object, process, or law as existing apart from God, the One. The aim of Islamic science is to show the Unity and interrelatedness of everything so that reflecting on the unity of the cosmos people will be led to the Divine Principle of Unity. Science studies the acts of the Creator, but it must always be guided by the Qur'an. The purpose of science is to shed light on the works of the Creator and thereby to respect and worship him. While Western science is secular and autonomous (science gains knowledge through independent inquiry and its results are relative and provisional) Muslim scientists explain the nature of things in terms of their supernatural origin: science is not an end in itself but a means of understanding God and of helping solve the problems of the community. Darwin's theory of evolution is an obstacle to Islam because it appears to exclude God and has no basis in the Qur'an which speaks of the special creation of the human by God, a new and unique species who did not evolve from other pre-existing species.
- One difference with the Judaeo-Christian tradition is that when Islam says God creates everything, this includes evil as well as good. God punishes those who commit evil even though he is responsible for its existence. God's will is sovereign and so if God wills a human to do evil, it cannot be avoided. Yet, the creature has the duty to struggle against evil. The right way for humans to relate to God's creation is contained in the role of Khalifah. The human is the Khalifah, the 'vice-regent' of Allah who holds the earth in trust, to care for it and manage it in the name of the Creator. The duty of Khalifah devolves on governments and organisations as well as individuals. God gives guidance to enable people to distinguish harmful and forbidden acts, because they are destructive and an offence to Allah, from those that are halal or approved.

*(For background reading see Religion and Science – F. McCarthy & J. McCann)*

*the ecological crisis* - *the main features of the current crisis*  
- *the origins of the crisis*

Brainstorm: What is the Ecological Crisis?

Take feedback and conclude that Ecology comes from the Greek root oikos meaning "home", our planet. It refers to the study of the complex conditions necessary for the surviving and thriving of living things. The Ecological Crisis is the breakdown in the network of relationships between the person in the human community, the human community in the earth community and the earth community in the cosmos.

Discuss: What are the main threats to our natural environment?

Take feedback and note on the chalkboard examples such as:

- the pollution of land, water and air
- the destruction of the rain forests
- the erosion of the soil
- the loss of sources of fresh water
- the spread of deserts
- the rate of species extinction
- global warming
- the thinning of the ozone layer

- etc.

Assignment: Pick one threats to our natural environment and research the signs of this ecological crisis in your neighbourhood

Or Interview the Environmental Protection Agency (EPA) about ecological issues (e.g., air and water quality) in your neighbourhood (www.EPA.ie) and report back to your class.

Brainstorm: What is the origin of the ecological crisis?

Take feedback and conclude by reference to:

1. The Enchantment of Technology: The mechanical world-view and the disenchantment of nature resulted in unrestrained technological control and mastery of the environment. Humans have become alienated from nature that is exploited by them.
2. Deism and an inadequate theology of Creation: God is external to nature; nature functions without God's continuing presence according to deterministic laws. A theological split emerges between nature and grace. Nature no longer speaks of God:
  - 'a nature-less view of God and a godless view of nature'
  - an inadequate interpretation of the Book of Genesis 1:26-27, as justifying the human exploitation of the world's resources.

### *the ecological crisis - attitudes to the crisis from the perspectives of theology and science*

Research a scientist's and theologian's perspective on the ecological crisis e.g. genetic modified food i.e. read Sean McDonagh (Columba Press/Veritas) or extract from Christian Perspectives on Development Issues - Food by J. Joseph pages 9-12 Trócaire/Veritas/Cafod in Read *Student Work: GENETIC MODIFIED FOOD* etc.

Discuss: What are the origins of this food crisis?  
Is religion a help or a hindrance to this ecological debate? Why? Why not?

Research Assignment: Pick an ecological issue that is currently topical and research it from the perspectives of theology and science.

Discuss: What are the origins of this crisis?  
Is religion a help or a hindrance to this ecological debate?

### *Assessment Questions*

- (a) Explain your understanding of 'ecological crisis' in the world today.
- (b) Give a scientific perspective on this crisis
- (c) Give a theologian's perspective on the crisis.

*Outcomes:* As a result of studying this section, students should be able to:

- outline the understanding of creation in one of either – Buddhism, Christianity, Hinduism, Islam, Judaism
- For higher level only – contrast two understandings of creation from two different religious traditions
- outline the contemporary ecological crisis
- present a theologian's perspective on the crisis
- present a scientist's perspective on the crisis.

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*Resources which teachers have suggested include:*

Breuilly, E. and Palmer, M. eds. (1992) *Christianity and Ecology*, London: Cassell  
 Khalid, F. and O'Brien, J. eds. (1992) *Islam and Ecology*, London: Cassell  
 McDonagh, S. (1986) *To Care for the Earth*, London: Chapman  
 The Earth Charter, available at: [www.earthcharter.org](http://www.earthcharter.org).

## Student Work: CREATION – THE COSMIC CLOCK

Carl Sagan, in *The Dragons of Eden*, tries to get across to us the history of our universe and our relative place in it. He asks us to imagine a "cosmic clock," the 15-billion-year lifetime of the cosmos compressed into the span of a single year. Within this compass, every billion years of earth history would correspond to about twenty-four days of this cosmic year. That would mean that the big bang would occur on January 1 and the whole of recorded history would fit into the last ten seconds of New Year's Eve, December 31. The story goes something like this:

January 1	Big Bang
May 1	Origin of the Milky Way Galaxy
September 9	Origin of the solar system
September 14	Formation of the earth
September 25	Origin of life on earth
October 2	Formation of the oldest rocks on earth
October 9	Date of oldest fossils (bacteria and blue-green algae)
November 1	Invention of sex (by microorganisms)
November 12	Oldest fossil photosynthetic plants
November 15	Eukaryotes (first nucleated cells) flourish
December 1	Oxygen atmosphere begins to develop on earth
December 5	Extensive vulcanism and channel formation on Mars
December 16	First worms
December 17	Precambrian ends. Paleozoic Era and Cambrian Period begin. Invertebrates flourish
December 18	First oceanic plankton. Trilobites flourish
December 19	Ordovician Period. First fish and vertebrates
December 20	Silurian Period. First vascular plants. Plants begin colonizing land
December 21	Devonian Period begins. First insects. Animals begin colonizing land
December 22	First amphibians. First winged insects
December 23	Carboniferous Period. First trees. First reptiles
December 24	Permian Period begins. First dinosaurs
December 25	Paleozoic Era ends. Mesozoic Era begins
December 26	Triassic Period. First mammals
December 27	Jurassic Period. First birds
December 28	Cretaceous Period. First flowers. Dinosaurs become extinct
December 29	Mesozoic Era ends. Cenozoic Era and Tertiary Period begin. First cetaceans. First primates
December 30	Early evolution of frontal lobes in brains of primates; First hominids. Giant mammals flourish
December 31	End of the Pliocene Period. Pleistocene and Holocene Period. First humans

Human beings emerge late in the last day of the year, and all recorded history would fit into the last ten seconds. As evolution proceeds at each stage of biotic development the tempo accelerates. It took about 3.9 billion years, some eight-tenths of earth's history, to generate photo-synthesizing bacteria. The entire development of plants and animals has occurred in the last one-ninth of the planet's history. And within that history of land animals, human beings occupy a mere fraction of the time, some 400,000 years, or less than one-tenth of 1 percent of earth's history. The development of agriculture began some 12,000 years ago or roughly 2 percent of human history.

1:30 pm	Origin of Proconsul and Ramapithecus, probable ancestors of apes and men
10:30 pm	First humans
11:00 pm	Widespread use of stone tools
11:46 pm	Domestication of fire by Peking man
11:56 pm	Beginning of most recent glacial period
11:58 pm	Seafarers settle Australia
11:59 pm	Extensive cave painting in Europe
11:59:20 pm	Invention of agriculture
11:59:35 pm	Neolithic civilization; first cities
11:59:50 pm	First dynasties in Sumer, Ebla, and Egypt; development of astronomy
11:59:51 pm	Invention of the alphabet; Akkadian Empire
11:59:52 pm	Hammurabic legal codes in Babylon; Middle Kingdom in Egypt
11:59:53 pm	Bronze metallurgy; Mycenaean culture; Trojan War; Olmec culture; invention of compass
11:59:54 pm	Iron metallurgy; First Assyrian Empire; Kingdom of Israel; founding of Carthage
11:59:55 pm	Asokan India; Chin Dynasty China; Periclean Athens; birth of Buddha
11:59:56 pm	Euclidian geometry; Archimedean physics; Ptolemaic astronomy; Roman Empire; birth of Christ
11:59:57 pm	Zero and decimals invented in Indian arithmetic; Rome falls; Moslem conquests
11:59:58 pm	Mayan civilization; Sung Dynasty China; Byzantine empire; Mongol invasion; Crusades
11:59:59 pm	Renaissance in Europe; voyages of discovery; Ming Dynasty China; experimental method in science
Now	Widespread development of science and technology; emergence of global culture; acquisition of the means of self-destruction of the human species; first steps in search for extraterrestrial intelligence.

(Adapted from *At Home in the Cosmos* by David Toolan)

*Student Work: SCIENCE AND RELIGION IN DIALOGUE*

“The unity we perceive in creation on the basis of our faith in Jesus Christ as Lord of the universe, and the correlative unity for which we strive in our human communities, seems to be reflected and even reinforced in what contemporary science is revealing to us. As we behold the incredible development of scientific research we detect an underlying movement towards the discovery of levels of law and process which unify created reality and which at the same time have given rise to the vast diversity of structures and organisms which constitute the physical and biological, and even the psychological and sociological worlds.”

- Pope John Paul II's writing to the Director of the Vatican Observatory June 1988

Question: What do the words of Pope John Paul II's show about his understanding of the relationship between science and religion?

*Student Work: STORY OF CREATION GENESIS 1– 2:4*

In the beginning, when God created the universe, the earth was formless and desolate. The raging ocean that covered everything was engulfed in total darkness, and the power of God was moving over the water. Then God commanded, "Let there be light"-and light appeared. , God was pleased with what he saw. Then he separated the light from the darkness, and he named the light "Day" and the darkness "Night" Evening passed and morning came-that was the first day.

Then God commanded, "Let there be a dome to divide the water and to keep it in two separate places" -and it was done. So God made a dome and it separated the water under it from the water above it. He named the dome "Sky." Evening passed and morning came-that was the second day.

Then God commanded, "Let the water below the sky come together in one place, so that the land will appear"-and it was done. He named the land "Earth," and the water, which had come together, he named "Sea." And God was pleased with what he saw. Then he commanded, "Let the earth produce all kinds of plants, those that bear grain and those that bear fruit"- and it was done. So the earth produced, all kinds of plants, and God was pleased with what he saw. Evening passed and morning came-that was the third day.

Then God commanded, Let lights appear in the sky to separate day from night and to show the time when days, years and religious festivals begin; they will shine in the sky to give light to the earth" -and it was done. So God made the two larger lights, the sun to rule over the day and the moon to rule over the night; he also made the stars. He placed the lights in the sky to shine on the earth, to rule over the day and the night, and to separate light from darkness. And God was pleased with what he saw. Evening passed and morning came-that was the fourth day.

Then God commanded, "Let the water be filled with many kinds of living beings, and let the air be filled with birds." So God created the great sea-monsters, all kinds of creatures that live in the water, and all kinds of birds. And God was pleased with what he saw. He blessed them all and told the creatures that live in the water to reproduce and to fill the sea and he told the birds to increase in number. Evening passed and morning came-that was the fifth day.

Then God commanded, "Let the earth produce all kinds of animal life: domestic and wild, large and small" - and it was done. So God made them all and he was pleased with what he saw. Then God said, "And now we will make human beings; they will be like us and resemble us. They will have power over the fish, the birds, and all animals, domestic and wild, large and small. So God created human beings, making them to be like himself. He created them male and female, blessed them, and said "Have many children, so that your descendants will live all over the earth and bring it under their control. I am putting you in charge of the fish, the birds and all the wild animals. I have provided all kinds of grain and all kinds of fruit for you to eat; but for all the wild animals and for all the birds I provided grass and leafy plants for food" -and it was done.

God looked at everything he had made, and he was pleased. Evening passed and morning came-that was the sixth day. And so the whole universe was completed. By the seventh day God finished what he had been doing and stopped working. He blessed the seventh day, because by that day he had completed his creation and stopped working. And that was how the universe was created.

Questions:

- For each of the days of creation in Genesis Chapter 1 – 2:4 describe the objects or spaces created. Do you see a pattern in days 1-3 and 4-6?
- What does this Genesis Story of Creation tell us about the relationship between God, human beings and creation?
- Compare the two creation accounts in Genesis. How are they alike and how are they different? In what ways do they complement each other?

## *Student Work: ISLAMIC CREATION STORIES*

### Islam – Creation Story

In the time before time, God was. And when God wants to create something, all he needs to say is Be and it becomes. So it was that God created the world and the heavens. He made all the creatures that walk, swim, crawl and fly on the face of the earth. He made the angels, and the sun, moon and stars to dwell in the universe. The Qur'an says, how God poured down the rain in torrents, and broke up the soil to bring forth the corn, the grapes and other vegetation; the olive and the palm, the fruit trees and the grass. Then it was that God ordered the angels to go to the earth, and to bring seven handfuls of soil, all of different colours, from which he could model man. God took the seven kinds of earth, and moulded them into a model of a man. He breathed life and power into it, and it immediately sprang to life. And this first man was called Adam.

God took Adam to live in Paradise. In Paradise, God created Eve, the first woman, from out of Adam's side. God taught Adam the names of all the creatures, and then commanded the angels to bow down before Adam. But Iblis, one amongst the angels, refused to do this, and thus began to disobey God's will. God placed the couple in a beautiful garden in Paradise, telling them that they could eat whatever they wanted, except the fruit of one forbidden tree. But the evil one tempted them to disobey God, and eat the fruit. When God knew that Adam and Eve had disobeyed him, he cast them out of Paradise, and sent them to earth. But God is merciful. The earth was created to give food, drink and shelter to the human race. The sun, moon and stars give light. It is a good world, where everything has been created to serve people. And people, the Qur'an teaches, should serve God and obey his will. For those who submit to the will of God will be saved, and taken to live forever in Paradise.

(Adapted from *Worlds of Difference* – M. Palmer and E. Bisset)

### *Assignment:*

Select a creation account and briefly summarise the story.

Question: How does it explain creation?

*Student Work:* GENETIC MODIFIED FOOD

Food is not just another commodity. Food is life. Moreover, the right to food is a fundamental one without which many other rights cannot be enjoyed. It is an indictment of the international community and our common humanity that so many people do not have access to adequate food or the means to produce it. 1.3 billion people are living on less than a dollar a day and over 800 million people are living or existing in hunger. Put differently every 3.6 seconds someone dies of hunger and three-quarters of these are children under the age of 5. Famine and wars cause just 10% of these deaths. The majority of these deaths are from malnutrition, as families just cannot get enough food to stay alive.

But what of the claim that genetically modified seeds with their possibilities of producing new supercrops can reduce the cost of food, increase supply and nutrition levels and thus contribute towards global food security? While technological progress may well enhance food quality and quantity over time the real question is how will those who are currently living with insufficient food fare. As power and profits are concentrated in a few agrochemical corporations controlling most of the genetically modified seed market, including those of staples such as wheat, rice and maize, crops which supply half the world's food, there is no guarantee that the poor and hungry will gain. Nor can a technological quick fix solution to hunger be pursued without examining who controls the technology, what are its environmental impacts and indeed how does it respect the cultures of communities around the globe. So trade policy and food security are fundamentally matters of justice and human rights. There are parallels between the Great Famine in Ireland (1845-7) where dependence on one variety of potato which subsequently suffered blight led to mass starvation and emigration with the growing dependence of global agriculture on a very limited number of crop varieties. The risks that this imposes are enormous where so many of the world's people depend on a few crops, and deserve far greater attention from policymakers than they have hitherto received.

The right to food is implicit in scripture and tradition and Catholic social teaching has made this view explicit: papal statements and social encyclicals have also emphasised that trade must benefit both parties equally. Nowhere is this more vital than in the food and agricultural trade. And Catholic social teaching in recognising the dignity of the human person, the universal purpose of God's creation, the priority of the common good and the preferential option for the poor clearly has a lot to say about food in our modern world.

Science, economics and ethics of genetically modified organisms, as well as the issue of patents and trade related property rights, need a great deal more study and a great deal less power politics. In all of this the divide between developed and developing countries is evident. While many of the earth's countries which are rich in terms of biodiversity are poor and in need of external financing, there is a great risk that short-term economic transfers may press countries to accept policies that are not in the long-term interests of their citizens or indeed of an international common good. Nowhere is this more evident than in the arena of international trade and agribusiness. The answers to who benefits from indigenous discoveries and practices in agriculture and food production are to date not comforting. Indigenous communities in the developing world are being excluded from the fruits of their labour. Indeed their innovations may well cost them dearly as their assets are modified, privatised and sold back to them by agribusiness. Meanwhile the world's top five agrochemical companies control almost the entire global genetically modified seed market. The genetic makeup of biopatented seeds is the property of corporations. And farmers' practices of saving seed for their following year's crop is a thing of the past for many patented crops. As a result of this farmers' groups in many parts of the world are calling for action against the patenting of seed varieties, which they have nurtured over generations.

Taking the preferential option for the poor as a cornerstone of any assessment of global food policies the conclusion is drawn that what is unethical and therefore wholly unacceptable is not the fact that research is being done that may create better crops and promote food security. But what is unacceptable and hence must be challenged is the growing concentration of control of the world's food supply in fewer and fewer corporate hands.

(Adapted from Christian Perspectives on Development Issues - Food by J. Joseph pages 9-12 Trócaire / Veritas / Cafod)

*Student Work: Genesis on Trial*



It all started rather harmlessly. On March 21<sup>st</sup> 1925, the Tennessee legislature passed the following law:

Be it enacted by the General Assembly of the State of Tennessee, that it shall be unlawful for any teacher in any of the Universities, Normals, and all other public schools of the state, which are supported in whole or in part by the public school funds of the State, to teach any theory that denies the story of the Divine Creation of man as taught in the Bible, and to teach that man has descended from a lower order of animals.

At first, no one expected very much would ever come of the law. It was merely in the books to pacify those who interpreted the Bible literally. Within days, however, the American Civil Liberties Union voted to test the constitutionality of the law. John Scopes, a biology teacher who taught evolution to his classes, agreed to submit to arrest. Clarence Darrow, the famous criminal lawyer, agreed to defend Scopes without fee. On the other side of the fence, the World's Fundamentalist Association hired the renowned William Jennings Bryan to assist the prosecution. A fundamentalist and three-time nominee for President on the Democratic ticket, he would counter the prestige of Darrow.

On July 10<sup>th</sup> 1925 the trial began in Dayton, Tennessee. To everyone's surprise, one of Darrow's first moves was to call Bryan as a witness. Here is a report of what happened:

Darrow read from Genesis: "And the morning and the evening were the first day."

Then he asked Bryan if he believed that the sun was created on the fourth day.

Bryan said he did.

"How could there have been morning and evening without any sun?" Darrow inquired.

Bryan mopped his bald dome in silence. There were snickers from the crowd, even among the faithful ...

"And you believe that God punished the serpent by condemning snakes forever after to crawl upon their bellies?"

"I believe that!"

"Well, have you any idea how the snake went before that?"

The crowd laughed, and Bryan turned livid. His voice rose and the fan in his hand shook in anger.

"Your honor," he said,

"I will answer all Mr. Darrow's questions at once. I want the world to know that this man who does not believe in God is using a Tennessee court to cast slurs on Him . . ."

"I object to that statement," Darrow shouted.

"I am examining you on your fool ideas that no intelligent Christian on earth believes."

*(Adapted from These Stones Will Shout – Mark Link)*