

Science & Belief The Big Issues

Teacher's notes

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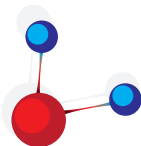
Learning activities to accompany
Professor Russell Stannard's series
of video discussions on the major
questions and controversies
concerning science and belief.



Science & Belief: The Big Issues

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Introduction

Professor Russell Stannard is Emeritus Professor of Physics at the Open University. He has not only built an international reputation as a high-energy nuclear physicist, but is also a licensed lay minister in the Church of England and a member of the Center of Theological Inquiry, Princeton, USA. A talented communicator of science to young people, his bestselling 'Uncle Albert' books, translated into 20 languages, make Einstein illuminating for ten-year-olds.

In this current project, Professor Russell Stannard works with a varied group of young students of philosophy, theology and science to tackle the major issues of science and belief. The resulting 12 short video films, freely available on YouTube, are a rich resource for education and good learning in schools and colleges for 14–19-year-olds and for adult education groups.

As the films point out, there are various possible responses by religious believers and atheists to the questions raised by scientific discoveries. The overall aim of the project is to provide the relevant background information needed in order to make up one's own mind on the issues. A number of alternatives are explored: viewers will choose which they find most reasonable.

These notes provide a teacher or a student with an overview of each programme, numerous suggestions for activities for good learning, and some discussion questions and quotations. The classroom activity materials may be copied for classroom use. Ensure full bleed when printing.

'I want to know how God created this world, I am not interested in this or that phenomenon, in the spectrum of this or that element. I want to know His thoughts; the rest are details.'

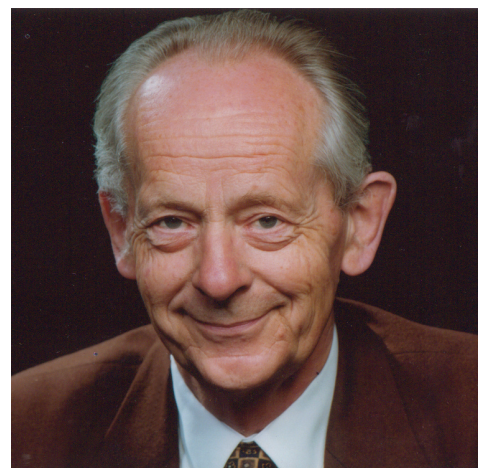
Albert Einstein

'The Goal of Science is understanding lawful relations among natural phenomena. Religion is a way of life within a larger framework of meaning.'

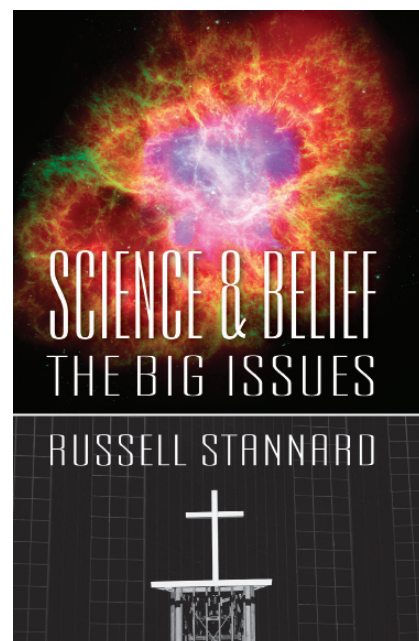
Ian Barbour

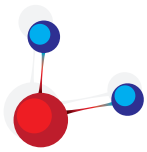
'There is more religion in men's science than there is science in their religion.'

Henry David Thoreau



Students and teachers who want to follow up the arguments and ideas more fully will find deeper analysis in *Science & Belief: The Big Issues* by Russell Stannard, Lion Hudson, 2012.





How to use these materials

What's the series for? How might it work? You will find the twelve 'Big Issues' programmes on science and belief on YouTube or on the *Science & Belief* disc. These notes and activities make it straightforward for the teacher to set up excellent learning activities stimulated by the programmes. Combining thinking skills approaches, games, discussion strategies, group work, dilemma and debate, the suggested activities meet curriculum aims in various subject areas. The work presents a reasoned and reasonable approach to controversial issues, basing opinions on arguments developed from evidence.

One exciting aspect of the project has been to be a part of a critically enquiring group of young people. We are grateful to all those who participated. The best uses of these activities can bring that excitement of debate and good learning into your classroom.

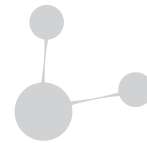
The series and the work are alert to the place our perspective or worldview plays in forming our ideas and opinions, but we also wanted to be sensitive to the extraordinary mysteries of our existence, even in the light of the remarkable advances and achievements of scientific enquiry.

How is the work structured?

There are twelve video films, nine of which address a part of the enquiry and debate directly, and three of which (numbers 4, 8 and 12) are 'round table' discussions in which Professor Russell Stannard and the young commentators on the issues share views and perspectives. Notes in the sections following include learning activities for groups of students, summaries of the programmes, and questions and quotations to stimulate thinking. These ideas and resources are provided free as pdf files on the web and on the *Science & Belief* disc.

How is it best to prepare?

First, view the video clips. This is the essential starting point. Read the pages of notes and activities that go with them, and decide which activities you want to use. Check to see if you need copies of one or more of the additional task and information sheets. Match the ideas to the ability and learning needs of your pupils. If you want to use the series with 14–16s, this may mean selecting the simpler approaches.



Learning aims and objectives

The *Science and Belief* series of videos and lessons aims to enable learners to:

- consider the challenges of questions about human origins, destiny, scientific forms of knowledge and meaning and purpose
- clarify their opinions about major issues in science and religion through developing understanding of different perspectives
- develop reasoned arguments that support viewpoints of key questions about the relationship of science to belief
- explore viewpoints different from their own in ways that enable learning and respect to grow
- express insightful and reasonable viewpoints, using evidence in their interpretations, and drawing balanced conclusions.

These aims and objectives are parallel to some of the learning intentions in British qualifications, including Standard Grade, GCSE and A levels in Religious Studies, Philosophy and Critical Thinking.





Before you start ...

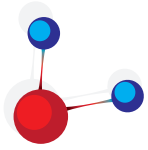
Complete this sheet of your impressions and ideas as fast as you reasonably can – we will refer back to it later.

Issues we will consider	Strongly agree			Strongly disagree			My reasons and comments
1 'The trial of Galileo for arguing that the earth went round the sun is typical of the way religion always opposes scientific progress.'	1	2	3	4	5	6	
2 'Religious belief is always being caught out by scientific discoveries. Theologians never anticipate scientific insights.'	1	2	3	4	5	6	
3 'Science has nothing to say about the origins of morality.'	1	2	3	4	5	6	
4 'The study of psychology inherently supports an atheistic viewpoint.'	1	2	3	4	5	6	
5 'The Adam and Eve story has been discredited by the theory of evolution, and has no further value.'	1	2	3	4	5	6	
6 'Everything about the human body is so well fitted to fulfil its function that it could not have developed by the random, chance processes of evolution alone.'	1	2	3	4	5	6	
7 'Treating Genesis 1–3 as non-literal is a recent idea forced on religious believers by new scientific discoveries.'	1	2	3	4	5	6	
8 'The miracle accounts in the Bible describe events that actually happened.'	1	2	3	4	5	6	
9 'Miracle accounts in the Bible are fairy stories that have no value.'	1	2	3	4	5	6	
10 'Scientists are well on the way to solving the creation question, namely, why there is something rather than nothing.'	1	2	3	4	5	6	
11 'The universe is hostile to life; the emergence of life is just an accidental "by product" of no ultimate significance.'	1	2	3	4	5	6	
12 'Science and religion are in conflict with each other. It is as simple as that.'	1	2	3	4	5	6	
13 'There is no such thing as free will. We are just physical objects subject to the laws of nature.'	1	2	3	4	5	6	
14 'It is almost certain that, out in space, there are forms of extraterrestrial intelligence far superior to our own.'	1	2	3	4	5	6	



Programme 1

Evolution and Genesis



Summary

This programme equips learners to consider and respond to these questions:

- How would you describe the relationship between evolution and Genesis?
- Are they in conflict with each other?
- Are they seeking different kinds of truth?

The programme presents information about the varied history of biblical interpretation, from St Augustine, via the Council of Trent, Vatican II and an example of a creationist: Argentinian evangelist Luis Palau.

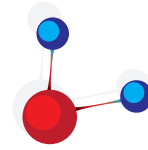
This account of the history of debates about creation raises a question about the nature of biblical revelation for Christians: are some parts of Genesis more like poetry than scientific writing?

The argument avoids simplistic opposition between science and theology – it's not necessarily that science is about 'how' questions and religion about 'why' questions. The relationship might be more subtle: without conflict, both disciplines explore questions of origin through lenses of evidence, meaning, exploration and deepening understanding. Though some regard science and religious belief like boxers – opposed to each other – maybe both disciplines have something worth hearing.



Activities

- 1 **Who's who?** It is good to use an engaging device for students watching the programme. In this first programme, we suggest you ask them to make a note of the names of the people they see as they watch, and write a word or two to help them remember each one. This programme will show them: Alexandra, Gordon, Lucy, Hermione, Sinead, Alex, Sian and Russell.
- 2 **What authority?** Authority is a major issue here. Some Christians respect the authority of their God in the Bible and see a clash between this and the authority of science (human reasoning and exploration). But this clash is not inevitable. Ask students to make three lists: What do creationists believe, and by what authority? What does evolutionary biological science claim, and by what authority? What does a Christian who accepts evolution believe, and by what authority? Students work individually, then share and refine their lists in pairs or groups of four.
- 3 **Six quotations:** Activity 3 is described on p.6.



Questions and quotes

'The "story" of Evolution is true in a way Genesis can't be. Based on observation and evidence, it explains how we came about.'

'The story of Genesis is not a true story – but it does tell the truth about humanity. We began with love, not by accident.'

'Martin Luther said that "each person is Adam or Eve to their own soul". He meant that we all move on from innocence, and we all choose evil for ourselves. I agree with this.'

If evolutionary explanations of humanity are accepted, is there then no room left for purpose in our lives?

'Eve was not created from the rib of Adam. Woman does not exist because of a surgical operation by God: this old fable is just that: an old fable.'

'The trouble with religion is that it often makes rather slippery or overblown claims to knowledge. By contrast, science takes a humbler view, always accepting that new observations and theories can revise our understanding. Humility on both sides would be good.'





Activity 3

Six quotations from the middle of the debate

These six quotations are all positive about the relation between science and religion. If you like, they take a middle ground position, which is opposed both by atheistic anti-religious science and creationist anti-scientific religion. What do the opponents say? Work with a partner, and stick another sheet of paper next to this one, on the left- or the right-hand side. Write into six speech bubbles the arguments and ideas you think on the one hand the creationist and on the other hand the atheist scientist would use against these points.

'For the religious believer, God is not an entity slipped into gaps in the empirical world. God is a spiritual presence and value who can be sensed in and through all things.'

'The study of the origins of the universe is, I believe, both a scientific and a religious voyage of discovery: scientific because we use the techniques of the scientific method – exploration and deduction; religious because it contains the element of awe and wonder, and it stimulates questions about purpose and ends.'

Rod Davies, Emeritus Professor of Radio Astronomy, University of Manchester

'Chance appears to have replaced God as the explanation for much that happens. In physics, for example, the solidity of stones and tables dissolves into the bizarre world of quantum theory – when viewed on a small enough scale. This is a world in which there is an inescapable uncertainty in how things develop. Chance is not an alternative to God but something one might expect him to know about and use. After all, if it is such an elegant way of producing a living world, we should not be surprised if it was part of his tool kit. God does not have to fashion, "each little flower that opens" in minutest detail. He goes one better and creates a system with the potential for self-creation.'

David Bartholomew, Emeritus Professor of Statistics, London School of Economics

Maimonides, the pre-eminent medieval Jewish thinker who was both a philosopher and a scientist, wrote the following: 'There is a positive commandment to have love and awe for Almighty God as it is written, "You shall love the Lord your God" (Deuteronomy 6:5). But by what method can one achieve this? When a human being contemplates [God's] great and awesome works (the Universe) and examines His creations, and from them he sees the unmeasurable wisdom and infinite capacities of the Creator, he will immediately be filled with love, and desire to praise and understand more about the living God.'

Einstein wrote: 'Whoever has undergone the intense experience of successful advances made in science is moved by profound reverence for the rationality made manifest in existence.' He named this special reverence 'cosmic religious feeling, which knows no dogma and no God conceived in man's image. Cosmic religious feeling is awareness of a spirit manifest in the laws of the Universe – a spirit vastly superior to that of man. The awareness is the strongest and noblest motivation for scientific research. And scientific research to me is the only creative religious activity of our time.'

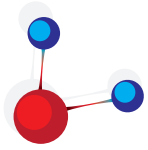
'Science and God, evolution and creation, are not alternatives. They are complements. The God of the Bible might well be a miracle worker on occasion, but normally he is to be seen at work through natural processes. It is God the creator who gives meaning to the blind mechanisms of science.'





Programme 2

Intelligent design



Summary

This programme equips learners to consider and respond to these questions:

- Is evolution on its own (i.e. without resort to any higher 'being' or higher 'purpose') able to account for the development of intelligent life?
- If so, how?
- And also, if so, does that get rid of God, or might we see God working through evolution?

The evolution of the human eye is discussed as a case study of the way incremental modification adds survival value over generations to a living organism. In the last two centuries, the understanding of evolutionary process through natural selection, the survival of the fittest, has expanded hugely.

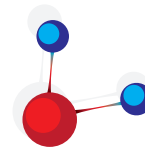
Some religious views see 'god' as a word for what science cannot yet explain – God is a 'god of the gaps'.

An alternative religious view might suggest that the process of evolution depends on intelligence, rather than randomness in its initial conditions, and the evolution of human consciousness includes a consciousness of this intelligence – which some call God. So God not only survives alongside evolution – God is the intelligent designer of evolution.



Activities

- 1 **Stupid producer:** Show students part of this programme, with the sound turned off (the first three minutes is suitable). Tell them the visuals have been made, but the script has been lost. Give them 6–7 minutes, in pairs, to create the soundtrack they think goes with the programme, and then get the pairs to swap their ideas. When you watch again, with sound turned up, the students will pay very close attention to what it actually says. Did they get near the real script?
- 2 **Design awards:** The idea of intelligent design suggests a human person is not a random product of time plus chance, but designed. If this is true, what aspects of the design seem good and which not so good? Ask students to consider: Is the eye better designed than the hand? The digestive system better designed than the reproductive system? The early years of life designed better than the last years? Are humans a superior design to camels, or slugs? Why? They should add a couple more comparisons of their own. Does the designer get an award, or a booby prize?
- 3 **Choose your analogy:** Is a human being like a computer, like an ape, like a child of God or like a demon? In what ways does the human person resemble each of these things? Which is the most accurate analogy?
- 4 **Walking discussion:** This activity is outlined on the next page, which can be copied for learners.



Questions and quotes

*'People should shut up about proof. You cannot prove God or atheism, so you have to use **evidence + interpretation**. And that leads to probability, but never to certainty. Evidence + interpretation = probability. There's no equation for proof.'*

'If we are designed by an intelligent designer, he or she doesn't seem that good – we all get ill, feel lots of pain, fail to achieve many things, then die. Couldn't BMW designers have done better, let alone a god?'

William Paley, theologian, deduced the existence of an intelligent designer from the complexity of the human body. Darwin described the process of evolution over three billion years on earth, filling in the gaps where God was formerly used to explain what we could not otherwise explain. Does Darwin make Paley completely redundant, or do we still need a designer?

Does God gamble? Is God perhaps like a bookmaker at the horse races, setting up an evolutionary system with some likely outcomes, such as the development of intelligence, but gambling on the precise outcomes, letting the universe unfold freely?

Intelligence and consciousness have great survival value – so might be understandable products of evolution. But evolutionary theory might face a bigger challenge if it is to explain the idea of a spirit, soul or transcendent element in human nature. Could our awareness of God have evolved too?





Activity 4 Walking discussion activity

This activity uses statements to develop responses for discussion.

Instructions for students:

- Take a copy and walk round. Talk briefly to someone about number 1, get their initials in the box that shows their view, and move on.
- Talk to someone else about number 2.
- Go twice through the sheet; get at least 18 other people to put their initials onto your sheet, to show where their views go. Give them your views too. Notice the diversity in the group.

If you want to, organise into two circles like a speed-dating ring, so that opinions can be exchanged quickly.

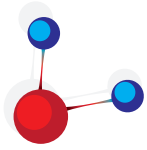
	Strongly agree _____ Strongly disagree									
1 The questions: 'How did the universe begin?' and 'Where do we come from?' are important to me.	1	2	3	4	5	6	7	8	9	10
2 Atheists and religious believers both have a similar problem explaining what came first, God or the Big Bang. And what caused that?	1	2	3	4	5	6	7	8	9	10
3 Evolution was God's way of making the beauties, complexities and wonders of the earth.	1	2	3	4	5	6	7	8	9	10
4 Genesis may be an interesting old story, but it has nothing to do with modern understandings of origins.	1	2	3	4	5	6	7	8	9	10
5 Evolution cannot just be a 'trillions to-one' slice of luck. There must be some guiding force at work, too.	1	2	3	4	5	6	7	8	9	10
6 Believing in God fits in well with believing in evolution.	1	2	3	4	5	6	7	8	9	10
7 The complex and exact usefulness of earth, the human brain or the reproductive cycle demand a designer.	1	2	3	4	5	6	7	8	9	10
8 The universe began by chance, not by the love of God: sorry, folks, it is all random.	1	2	3	4	5	6	7	8	9	10
9 Science explains the origin of the universe. Religion explains the origin of good and evil.	1	2	3	4	5	6	7	8	9	10
10 You don't need to believe in God to live a morally excellent life, but it does help some people.	1	2	3	4	5	6	7	8	9	10

When you have collected lots of opinions from the rest of the class, then sit in a group of three for a few minutes, and compare answers. What kind of arguments or reasons do people give for the views they hold here?



Programme 3

Morality



Summary

This programme equips learners to consider and respond to these questions:

- Where does the human moral sense come from?
- Is it God given, or something made by humanity?
- How far might evolution play a part in understanding at least some aspects of morality?

Our labelling of some kinds of behaviour as wrong or evil is generally uncontroversial – racism, abusive behaviour, selfish lies, expressions of hatred, would all be widely accepted examples. Humanity seems to need some moral guides, rules or principles.

If animal behaviour includes what looks like needless cruelty, then it also includes examples of unselfishness, especially with regard to an animal's babies!

Science might be useful in tracing and understanding some of our moral thoughts as well: if it is an advantage to a species to practise 'you scratch my back and I'll scratch yours' reciprocity, then is it also possible that higher forms of altruism, love and compassion can grow from our animal nature? Has love evolved?



Activities

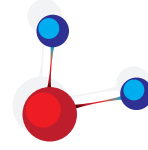
- 1 **Watching brief:** Ask students to work in threes as they watch this clip. Each should attend to one of these three things:
 - a **Images:** What imagery, visuals and material to look at has been used in this programme? Why might the producer have thought these were appropriate?
 - b **Body language:** Ask students to comment on Russell Stannard's body language. What does his movement and facial expression 'say'?
 - c **Arguments** What are the strongest parts of the argument? Can you spot any weaknesses?

When they have watched the programme, spend a few minutes comparing what their brief revealed.

- 2 **Is the moral sense evidence of design in humanity?** On p.10 there are six pieces of an argument that bases belief in a designer on the human moral sense, each written on a jigsaw piece. Give pairs of students a cut-out set of these and ask them first to put the six points in the right order (one right order is the order in which they appear across the page, but some other orders are arguable). Consider in discussion:

- Which step in the argument is easiest to criticise?
- Does the argument work? Why or why not?
- If the universe is a random accident, what meaning can be given to our moral sense?

- 3 **Altruism: is it a social construct or evidence for God?** Page 11 provides a text and questions to prompt discussion.
- 4 **Three dilemmas for living:** On p.12 students are presented with three dilemmas to consider.
- 5 **'And man said ...'** A reading and creative writing activity is presented on pp.13-14.



Questions and quotes

'One problem of meaning for a totally atheistic account of our origins is that there is no reason to prefer love over hate, peace rather than conflict, goodness to unkindness. In evolutionary terms, respect and compassion are not preferable to racism and homophobia. Both atheists and believers in God need to justify their ideas about ethics. Where does goodness come from?'

'To be dominated by the reptile brain, the oldest part of the evolving brain, which has no emotion and which provides for the basic survival needs of territory, food and reproduction, is to fail to realise the human potential for transcendence.'

Professor John Hull

Is it possible that we have evolved only a little beyond selfishness, in the direction of altruism? How can humanity evolve morally further?

'I believe that bullying, child abuse and rape would be wrong even if they contributed to the survival of the fittest. So there must be some way of saying why an action is good or evil – even if there's no God.'





Activity 2 Is the moral sense evidence for God?'

These six jigsaw pieces set up a sequencing activity. The argument has six steps. Can students identify the steps to show they understand it? Is the argument compelling? What are its strengths and weaknesses?



Around the world, in many cultures and religions, some basic moral ideas are found everywhere: lying is bad, the truth is good. Caring for your relatives is good even when it hurts you. Self-sacrifice is noble and selfishness is not. Theft or killing are condemned. This coincidence of moral ideas implies something about the nature of a human being: we are moral persons. Where does this moral sense come from?

Evolutionary biology could account for the development of genetically influenced human behaviour. So some altruistic (unselfish/loving) behaviour seems to be good for the species (rather than for us as single individuals). This line of reasoning also explains why we are selfish: evolution gives an advantage to the fittest – that could mean the strongest, most assertive or even most aggressive.

But biology doesn't give a complete account of where our moral sense comes from. Being good, living a life of love, is never merely about doing what your genes tell you to do. A good action must be a free action. Science can tell us what happens genetically, and therefore shows us what free actions of love might be available to us. Science therefore may help us to think about what altruism means, but it doesn't completely explain acts of love or unselfishness.

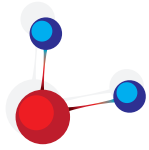
Now if the moral ideas of humanity are all similar despite cultural differences, one way of explaining the similarity is by design: we are designed to be good, to exercise moral freedom and to know good from evil. This aspect of the claim to design is different from saying 'there must be a designer God to make the eye, because it is so complex'. The moral sense is not exactly complex, but it might reflect the intentions of a designer (God?).

Domestic cats, like their wildcat ancestors, and like the lynx, cheetah and tiger, kill because of genetically determined patterns of behaviour. In the same way, human beings have some genetic influence in their behaviour. But the question of morality is this: can we transcend natural selfishness and be freely good? I think so, and this points to a transcendent designer. Goodness is what happens when human beings move beyond their animal nature and express love. The capacity for goodness is God given.

The idea of a 'God-given' or designed moral sense which humans can freely choose to follow or ignore explains what a free choice for goodness means. The alternative is that all our ideas of goodness are not free, but genetically programmed into us. I believe that goodness is a real human choice, and the best explanation for how that choice can exist in our nature is that the design in evolution to make us moral comes from God. So the conclusion is that there is a good argument for God from our shared human moral sense.



Activity 3 Altruism: is it a social construct or evidence for God?



This discussion needs to tackle in detail the perspective that altruism is a social construct, comparing it with the idea that the human moral sense has a transcendent origin. Students may find the definition of altruism as 'free and unselfish or loving action' helpful. Put the idea that altruism is a social construct under the microscope. Copy for discussion the text in the box below.



For discussion:

- Must altruism be either a social construct, or an evidence for God?
- Do students agree or disagree with the argument in the box? Where is it strong and weak?
- This is an unusual argument for God: is it a part of the more common design arguments, or separate from them?



Three ethical dilemmas

Our sense of right and wrong is often sharpened up and clarified by thinking about what happens when moral principles clash.

- Discussions of moral dilemmas are a way of exploring these clashes. On the next page, there are three dilemmas for students to think about which relate to science and belief.
- Address each one to a different member of the group and discuss their responses together.
- Can students write some more dilemmas like these, with which to challenge each other?
- This activity aims to help pupils debate altruism in action.

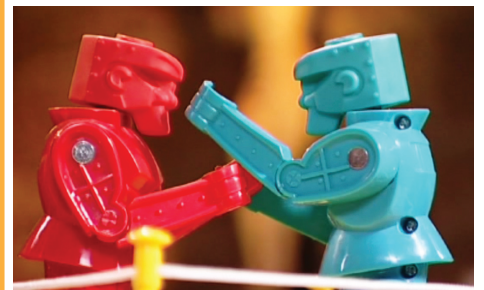
Human moral sense is evidence for a creator or a designing intelligence

The human moral sense contributes to the case that we are the product of a moral mind, not just a random slice of luck. Many species of animal do not live by the social rules humans recognise as good (no bullying, respect mating rules and so on). Generally the strongest male gets the mates – several of them, and the weaker gets none. *Human* males are sometimes said to be also naturally polygamous, so why would a society made up of them come to applaud monogamy? When the lion takes over a lioness that originally 'belonged' to another he will systematically bite to death the offspring of the former (and presumably weaker) male, so the lioness devotes her attention solely to tending the presumably stronger offspring of the tough newcomer. So killing is good – for the development of the lion species. So why do humans have the idea that the death of children is always a bad thing? An ethos that systematically neglected the needs of young children would not be to the detriment of the members of that society who were already adult (and so themselves are no longer in danger of being eliminated in this way), so there would be no reciprocal benefit to them in respecting weaker children. Our moral sense is different from animal behaviour.

In general, why do we or should we care for the sick and disabled? If people support these arrangements because we ourselves might one day benefit from them (e.g. if we were ourselves to become disabled) then how can we explain why able-bodied people don't just cash in on their luck? Why waste resources on the others who were unlucky?' In other words the view that morality comes from society is built on shaky ground.

It makes more sense to note the levels and practice of human love or altruism in all human societies as a piece of evidence – not a proof – of a transcendent mind behind our evolution.

Perhaps there is a choice to make: either we are not really free to love, or our capacity to love comes from some higher mind. Take your pick.





Activity 4 Three dilemmas for living

Dilemma A: What shall we tell the children?

Your sweet little niece Daisy is 5 years old this birthday, and you have agreed to take her to the zoo for the day. Her mum and dad are Creationist Christians, and have always nurtured her to see the world as God's gift, and to praise him for every leaf on every tree. They are lovely: they never push their beliefs down your throat, or attack people who see the world differently, but they are bringing their daughter up as a young Christian to believe God made the world in six days.

You and Daisy wander round the zoo for the whole sunny afternoon, enjoying the treat, and it's the monkey house that is most fun. You watch together as the gibbons have fun with bananas.

Daisy says: 'Isn't it amazing that God made gibbons to look like us?'

You think of all you know about evolution and creationism, and realise this is a big question. Should you tell her that her parents' view is not widely respected? How do you reply?

Also consider:

- If she is 8 or 11, do you answer differently?
- Is it, as Richard Dawkins says, 'a form of child abuse' to bring up a child to believe in God the creator? What makes him say that?
- A huge debate rages about teaching creationism in schools: should this happen, or not? How and why?

Dilemma B: Is a human life more precious than an animal life?

You have got work on a new drug-testing programme in a lab, and occasionally, under strict control in law and through your medical innovation company, you carry out tests on animals before a drug is made available for human use. You have been asked to complete testing on a drug which has a huge potential benefit for patients suffering from Motor Neurone Disease.

You plan the final testing stages, and it is clear that testing on higher primates – chimpanzees, for example – will be an essential step to ensure the drug will work safely with humans. Your boss suggests you use four chimps, testing them with the drug to find out what dose is lethal, and what is helpful.

The dilemma you face is whether it is right for you to kill four chimps as a means to possibly saving or prolonging many human lives. Do you go ahead and do the tests, or risk your job?

Also consider:

- Is a human life worth more than an animal's life? Why/why not?
- We have nearly 7 billion human beings but only a few hundred Bengal tigers. Does scarcity add value to life?
- If there is heaven, can animals go there?
- Is using animals for cosmetic testing morally different from using them for testing potential life-saving medical advances?

Dilemma C: Is scientific progress worth more than human love?

Your glittering career in astrophysics is going really well, and you are head-hunted by the Massachusetts Institute to join the world leading programme of searching for extraterrestrial intelligence. They are flatteringly complimentary about your work, and offer to double your salary.

At the same time you have met and fallen overwhelmingly in love with the One. Gorgeous in every way, the One lives and works in a deprived area of London, caring for homeless people. You are wildly impressed, and head over heels too. The One says: 'If you go to Boston, then we can't really continue our relationship. And I'm afraid I can't leave the work here – my people need me.' You feel the tug both ways: scientific innovation, or the love of your life?

Should you stay, or should you go?

Also consider:

- What matters most in human life – love or knowledge?
- Is it noble to give your full energy to scientific discovery? Why? Is it even more noble to love your neighbour? Why?
- Most of us don't face these choices as sharply as the dilemma story – but what are your priorities in life? What do they tell you about how much the big questions of science and belief matter?



Activity 5 'And man said ...'

This is a story about humankind's treatment of the earth since the industrial revolution. It is adapted from an unknown source. Students can compare it with the story of God creating the world in Genesis 1. It includes some Jewish insights into human responsibility and asks questions about the nature of the universe and the nature of humanity. It is good to have it read aloud by two voices, the second always taking the part of the paragraph that begins 'And man said ...'.

On the seventh day before the end of the earth, man created all kinds of machines, which meant that one person could do what previously hundreds of people were needed to do; and as well as that, they could do it much faster than before.

And man said: 'Now we can really start to improve this creation that God has given us for the good of all.'

On the sixth day before the end of the earth, man discovered oil, and made petrol, diesel and jet engines, and rushed about all over the earth for holidays and business trips, and poured thousands of tonnes of pollution into the air.

And man said: 'Everybody has the right to travel wherever they like, as often as they like, and as fast as they like – except those people who can't afford it – and even if it pollutes the earth, we'll find a better way of running the engines before the pollution gets too bad.'

On the fifth day before the end of the earth, man decided that the way nature had done things ever since the beginning of creation wasn't good enough, and the land needed soaking with chemical fertilisers, and the crops spraying regularly with pesticides to stop weeds growing.

And man said: 'From now on these crops will be bigger and better, and they will all be ours to eat. We won't share the crops with the birds and the wild animals, and if some wildlife disappears for ever it won't matter because God made far too many types of wildlife in the first place.'

On the fourth day before the end of the earth, man invented nuclear weapons to kill people and nuclear power stations to make energy.

And man said: 'Now that we can destroy the whole of the earth with nuclear weapons by pressing just one button, we will have peace. Now that we can make so much power from a little bit of uranium we will be able to do so many more things. By the time we have to work out what to do with all the nuclear waste we leave behind, it will be our grandchildren's problem, or maybe we'll have thought of something by then. Anyway, we didn't get where we are today by thinking too much about the future.'

On the third day before the end of the earth, man invented biological weapons that made people's enemies get sick and die.

And man said: 'It's terrible that we should even have to think of hurting people in this way, but we have to invent them because if we don't do it, some of our enemies are bound to invent them, and we can't allow them to use the weapons against us. Of course, they will never get used on purpose, and we hope there will never be an accident which makes the weapons get out.'

On the second day before the end of the earth, man discovered how to make genetically modified food.

And man said: 'This is the best thing we have done so far. Now we know all about making life itself, and we will be able to create anything. We will be just like God.'

On the last day before the end of the earth, man finally realised that he had completely destroyed the way plants, animals and people could live on the earth. He also had no idea how he was going to get himself out of the fix he was in.

And man said: 'Oh God!'

And God said ...



Questions for discussion and writing

- 1 Do you think 'man' in the story includes women? Why or why not?
- 2 What did people invent in the story?
- 3 Does everything that humans invent spoil the world?
What inventions do you think are good, and why? In what ways do you think each of the things that humans invented in the story helps or spoils the world?
- 4 This story is similar and different to the creation story which Christians, Jews and Muslims tell, as in Genesis chapter 1. Refer back to this text. Make two lists: all the similarities and all the differences.
- 5 God is the lead character in the first story, but only comes in at the end of the second story. Why? What difference would it make if God was in the second story? What would God say at the end of each of the last seven days? Work out seven sentences for this.
- 6 Do you think the story gives the right impression of what humanity is doing to the world?
- 7 What is the message of this story?
- 8 Why do you think the world has problems with the environment? How do you think they are caused?
- 9 What do you think you can do to stop some things spoiling the earth?
- 10 Is God to blame for the way the world is? What would Jewish people say about this – and what do you think?

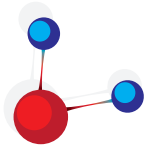
Brainstorm as a group: all the things which are a threat to the world, which might lead to 'the end of the world as we know it'. Start with pollution and war.

Creative writing: Write a 'countdown to the end of the world' story of your own. Include the 'voice of God' to comment on what happens in your story.



Programme 4

Round table 1



Summary

The round table discussions in *Science & Belief: The Big Issues* use our community of college students taking A levels to explore, summarise, clarify and refine understanding.

Ancient communities understood their world differently from us, but were not stupid.

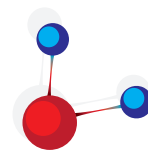
Intelligent design arguments appeal to the human need or desire to find significance in our consciousness. But this tells us little about whether these arguments for a designer are valid – in fact, it is hard to find a basis for the claim that there is or is not a designer.

If the observations of science help to explain the origins of morality (survival value?) there is still a need to find explanations of the heroic, self-sacrificing or loving behaviour of those who live on the high peaks of the human moral mountain.



Activities

- 1 Ranking respondents:** In the round-table sections of *Science & Belief* a group of young people debate their own ideas in the light of Professor Russell Stannard's material. Ask students to rank themselves in relation to the seven round-table participants – who is closest to them, who do they most agree with, and who do they think is talking from an opposite point of view? Compare notes. Give them this list of who is taking part: Sian, Alexandra, Alex, Rachel C, Rachel A, Jonathan and Hermione.
- 2 You never know it all:** 'I'm not a biologist' says Rachel C at one point. And no one can be equally good at astrophysics, biochemistry, evolutionary history and philosophical theology. Which disciplines most inform students' views of the questions in science and belief? Which one or two disciplines do they feel they need to know more about?

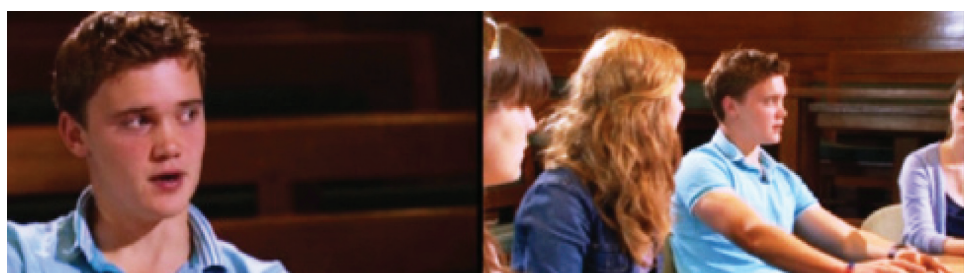


Questions and quotes

'Many creationists fear that if they don't claim hard facts then religion will be undermined.'

'In secularising societies, religion declines and immorality increases – so even though it is perfectly possible to be a good and altruistic human being without religious belief, it does seem that religious authority buttresses moral behaviour for many of us human animals. Is this a good thing about a more religious society?'

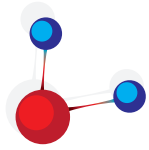
'A child brought up without society and relationships might give evidence of whether the moral sense is innate, or constructed by society – but most of society would say such an experiment was immoral!'





Programme 5

Creation



Summary

This programme equips learners to consider and respond to these questions:

- In the light of modern understandings of cosmology, is it still possible to think of a creator God?
- If not, then what else could be the answer to the question: 'Why is there something, rather than nothing?'

Sometimes there's confusion between the two words 'origins' and 'creation'. The Big Bang is about how the universe originated. The question of whether it is a creation is expressed like this: Why is there something, rather than nothing?

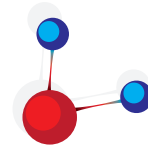
As theologian Paul Tillich puts it, 'God is the ground of all being.' That might be a definition of God that works for some people.

'M theory' is described: an intelligible way of understanding how the universe (and possibly other universes) came into being. But is it justified to ask how M theory itself came into being?



Activities

- 1 **Guess what's next:** Show learners the first opening sequence of the programme, in which several students give their ideas on the topic of creation (75 seconds is about right). Tell students that the programme is about 10 minutes in length, and ask them to note down in 3–4 minutes what they think the programme will cover. This makes them curious about what it does cover. Then show them the rest of this programme. What surprised them? What did they guess right?
- 2 **How many stories?** Ask students to reassemble the cut-up text of Genesis 1 and 2. Chop up the text into 12 chunks – about 5 verses each will do – and see if they can stitch it back together.
- 3 **What do you believe about cosmology and why?** The questionnaire on the following two pages explores students' ideas and sets them two questions that relate to the challenges this view faces. In groups, students work through it, talking about what it shows and how to respond. Of course, questionnaires like this can get it wrong – the first discussion point is whether it tells the truth about these views.



Questions and quotes

"'Why is there anything at all, not nothing?'" This question is equally problematic for both atheists and theists.'

'I'll Just Let the Mystery Be'. Iris Dement sings this lovely song (do look at a version on YouTube). Is it anti-scientific to say: 'It's a mystery, we will never know.' Or is it realistic?

'Something rather than nothing – and what a something! The universe we find we live in is beautified with sunsets and symphonies, energised with mountains and deep space, tingling with love, sexuality, discovery. Hard to conceive it is all a random accident.'

In his novel about nuclear holocaust, *On the Beach*, Neville Shute pictures Australians waiting for several months for the nuclear winter to enclose them. A Morse code signal of random dots is the only thing they can hear from the northern hemisphere. It is just caused by the wind blowing on a tapper. No one has survived. If the universe is without design, aren't the works of Shakespeare just like that random Morse code tapping?

'The depressing likelihood is that we live in a random universe, and all our science is just a farcical blip in a meaningless waste of space and time.'





Activity 3 What do you believe about cosmology and why?

Read these comments carefully – maybe aloud? Choose one reply to each of the following. Score your choices at the end from the scheme overleaf.

1	'Creationism is just plain wrong. People who say the Bible story of creation in six days about 6000 years ago is true are deluding themselves. Denying the evidence for evolution and the Big Bang makes little sense in today's world.'	a Agree: God created us through evolution b Agree: because there is no God c Disagree partly d Disagree totally
2	'God is a possible explanation of the universe. And a good explanation.'	a Agree strongly b Agree partly c Disagree partly d Disagree totally
3	'There are two creation stories in Genesis. God speaks to create in one, and in the other he plants and models with clay. In one humans are made last, in the other they are early on. These stories are nothing to do with science or with history.'	a Agree: they are myths that tell truths b Agree: they are simply wrong c Disagree partly d Disagree totally
4	'Science can answer all the questions that matter about where we come from, when the universe began, how it happened and why it matters.'	a Agree strongly b Agree partly c Disagree partly d Disagree strongly
5	Why is there something, rather than nothing? If we are beautiful, clever, amusing and convinced our lives are significant, then how? Why? Does love give life purpose? Does happiness make sense of living?	These questions: a Really matter b Are very interesting c Don't matter much d Are as meaningless as a whoopee cushion
6	'There could be trillions of universes. We are the only one in which the "luck of the draw" has made it possible for us to observe. The rest are all darkness and nothingness.'	a Maybe: so we are just a pointless blip b No: this is just unimaginable c No: God made this universe with love (and maybe others too) d I agree – and this explains a lot
7	'The more the universe is comprehensible, the more it also seems pointless ... a more or less farcical chain of accidents.' Stephen Weinberg, Nobel Laureate	a Agree strongly b Agree partly c Disagree partly d Disagree totally
8	'Evolution is a better explanation of human life on earth than the designer argument that says "God did it". Evolution may not explain everything perfectly (yet), but the theory is good because it follows the evidence.'	a Agree totally b Agree, but also believe in God c Disagree partly d Disagree totally
9	'All these questions about science and belief come down to authority – whom do you trust? What do you believe? Ancient writings, or modern reasoning? Authority is the issue. And I trust modern reasoning rather than ancient myths.'	a Agree completely b Agree partly c Disagree partly d Disagree totally
10	'If there is intelligent life on other planets, then God knows all about it, and loves those forms of life as much as s/he loves humanity.'	a Agree strongly b Agree partly c Disagree partly d Disagree totally

The score sheet over the page will ask you some more questions and suggest a description of your beliefs. See if it works for you. Compare answers with partners.

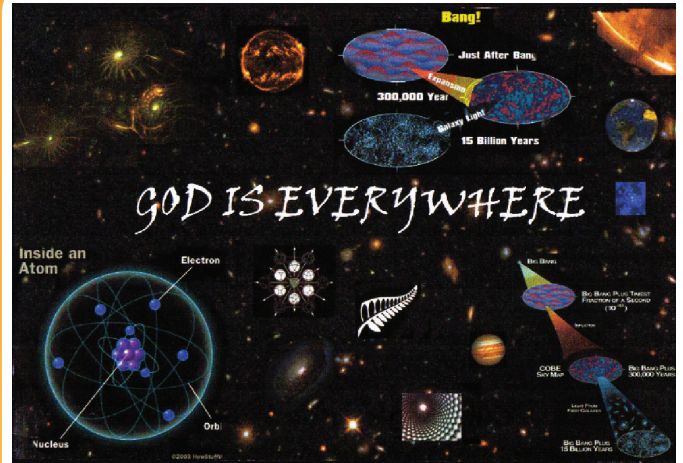


What do you believe?

Add up your scores using this chart. What is your total? See if the interpretations in the boxes below fit your own views.

Question:	a	b	c	d
1	2	5	2	1
2	1	3	3	5
3	3	5	2	1
4	5	3	2	1
5	1	3	4	5
6	5	3	1	4
7	5	4	2	1
8	5	3	1	2
9	5	4	2	1
10	1	2	4	5

Compare answers: Compare the range of scores of people in the class. Consider carefully why there is such a range. Note down three questions to ask of people whose scores were very different to yours.



Emma, 14, says: 'I wished to convey the omnipresence of God, present in the furthest stars and the smallest atoms. The picture of the younger universe taken by the Hubble Space Telescope shows many galaxies in space: I believe God fills the whole of the universe. Images of smaller and more familiar things (the Earth, planets, the Sun, the snowflake and the fern) have amazing detail. I wished to show that God creates beauty even in the smallest things. It seems impossible to me that objects of such beauty and intricacy could have been created by mere chance: I believe that there must have been an omnipresent deity of some kind to create everything with such precision.'

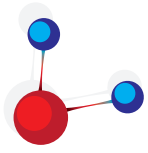
Interpretations: Do you think they fit? Can you answer your two questions?

10–18	<p>You have strong convictions about God as creator of the universe, and you tend to be sceptical of the reasoning and evidence of science. You might call yourself a 'creationist' and you might be proud to believe the Bible.</p> <p>Your questions:</p> <ul style="list-style-type: none"> • If you are so sure of the Bible, then how do you respond to quotation 3? • What do you think children should learn in primary schools about creation and evolution? Why?
19–29	<p>You are a theist who tries to balance respect for sacred writings with respect for human reason. Perhaps you believe that it was God who gave us reasoning, or that 'God is a scientist.' You sometimes wonder how to balance your beliefs.</p> <p>Your questions:</p> <ul style="list-style-type: none"> • If you have to choose between trusting ancient text and modern reasoning, how do you make the choice? • Why do you think the ancient texts still matter?
30–39	<p>You are somewhat agnostic about god, but you accept the idea that life's meaning and purposes might be explained not by science but by some sort of spiritual or ethical vision. You respect scientific reasoning without denying that there might be 'something more'.</p> <p>Your questions:</p> <ul style="list-style-type: none"> • What issues of meaning would be raised for you if we found intelligent life on another planet? • Many people say 'I believe in something out there (but I'm not religious).' How would you defend this view against the charge that it is a cop-out, a weedy refusal to commit?
40–50	<p>You are pretty confident that scientific explanation and rational thought show old-fashioned beliefs about God and creation to be false. You reject the validity of some questions about meaning and purpose – life is meaningless by your account, maybe.</p> <p>Your questions:</p> <ul style="list-style-type: none"> • If scientific thinking makes religious belief so useless, why do you think it is so persistent (about three-quarters of the world's people are religious)? • Do our lives have any meaning or purpose? What possible basis for this can you express?



Programme 6

The anthropic principle



Summary

This programme equips learners to consider and respond to these questions:

- Why is the universe friendly to life?
- Was it deliberately designed like that, or is it just a part of a much larger multiverse picture?

We are observers of our own universe: are we a miracle, or are we a blip? One young commentator suggests that the only purpose of life is the one we make up for ourselves. The 'great balls of fire' in the universe of a hundred billion galaxies make any human being feel like an atom in an ocean.

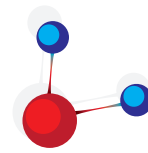
But, strangely, we can observe this vastness. This particular universe is one that is watched, by us, from inside. It's as if a character in a novel talked back to the author.

Is the universe homely or hostile? Russell Stannard outlines the rather user-friendly conditions for evolving life which the universe has thrown up. There's no proof here of course, but anyone might interpret the observations we make of the universe: the universe is life friendly, and fine-tuned for life. That's the anthropic principle. But is it an anthropic principle or an anthropic chance?



Activities

- 1 Life's like a farce:** In a dramatic farce, doors slam, actors run in and out, everything is a bit crazy, random coincidences happen all the time. Discuss with students: Is farce a good metaphor for the universe? (Nobel Prize Winner Steven Weinberg: 'Human life is a more or less farcical outcome of a chain of accidents'). Or is human life more like a tragedy, a comedy or a history?
- 2 The anthropic principle: ideas and alternatives**
The next page is to copy for students. Look at the page together and ask students to rank the seven ideas in different ways: which is most likely? Which is most likely to be popular? Which is least religious? Are any of them so far fetched that they are in a different league to the others? Which are credible?
- 3 One or more universes:** Discussion. The choice thrown up by the anthropic principle is between a single universe especially designed to accommodate life on the one hand, or a multiverse. Perhaps there are millions of universes, in which ours is the only one with life in it? If it is a multiverse, it is difficult to see how one could ever prove the existence of the other universes, and show that they are run on different lines from our own. Does this mean that scientists who accept the multiverse theory are exercising faith? If so, does this kind of faith differ in any way from that exercised in religion over the existence of God? Is the choice between God and the multiverse, or could one believe in both?

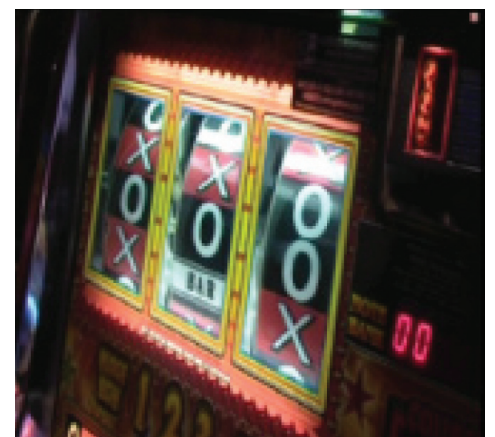


Questions and quotes

'If you look at the universe and decide it was designed by God, then what kind of God seems to have done it? Maybe one who likes to play around, starts lots of stuff, then loses interest in most of it, and doesn't care too much what happens inside his games. This does not sound like the God of the Muslims, Jews or Christians.'

If there are many universes – if "multiverse" is a correct hypothesis – then this might be the only lucky one, full of life. What's more likely – trillions of universes, or one God? Your view of that often depends what you think to start with.

'If evolution was God's way of creating us humans, then he also used it to create trees, plants, galaxies, planets. So isn't it likely that God might not be content with just one universe? Perhaps he has made other life-friendly universes too.'





Activity 2 The anthropic principle: ideas and alternatives

Paul Davies, eminent commentator on issues of cosmology, wrote *The Goldilocks Enigma* in 2006 to review the debate about the universe we live in, its origins and whether it has features such as design or purpose. Goldilocks, in the story of the three bears, keeps finding a chair, a bowl of porridge or a bed that is 'just right'. Similarly, and perhaps luckily, the human race lives on a planet neither too hot nor too cold, with enough but not too much gravity. A thousand other happy circumstances have made our evolution possible. Davies suggests that there are seven different ways to conceive of this remarkably human-friendly set of circumstances.

The Absurd Universe

There is no point or purpose, no design or sense in our universe. It just happens to be like this. You can't really even say it's luck. It just 'is'.

The Unique Universe

There is an as yet undiscovered 'theory of everything' which, when physicists can explain it, will say why this single universe exists. The 'theory of everything' will show the universe is balanced exactly as it is.

The Multiverse

There are multiple universes, maybe trillions in number. We can observe only this universe, because this one is the kind of universe where observers like us can evolve.

Creationism

A creator designed this universe with the purpose of supporting life. Complexity and the evolution of intelligence come from a creative mind: this is a designed universe.

The Life Principle

The universe is governed by a 'principle' that life and mind are the directions of evolution. We owe our good fortune to a hidden principle in the universe towards life's development.

The Self-Explaining Universe

The universe is in a kind of causal loop in which the only universes that can exist are those with a capacity for consciousness.

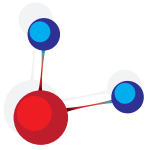
The Fake Universe

The universe is not real. It is like a simulation game. We experience as reality what is actually a part of some game, simulation or virtual world. So all our knowledge is fake.



Programme7

ETI: intelligent life out there?



Summary

This programme equips learners to consider and respond to these questions:

- What impact would the discovery of extraterrestrial intelligence (ETI) have on religion?
- How would such a discovery alter your assessment of the importance or otherwise of human beings? Would it make us less significant in the universe?

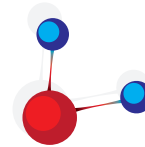
Extraterrestrial life is a possibility, but nothing tells us for certain what might exist on distant planets. Here on earth, while the search for extraterrestrial intelligence (SETI) goes on, we still only have guesswork. Earth-like planets are many, but is human life unique? How would it be if we found life on other planets, but nothing more advanced than a worm or a slug?

Some people might live with no intellectual accomplishments, no unusual intelligence, but with a high level of spirituality, of loving unselfishness. Could ETI be spiritual in ways we cannot yet conceive on earth? What if the extraterrestrials were a pure race with no sin or evil? Or if they came to us seeking the wisdom of the Buddha?



Activities

- 1 **A new message from God?** Ask students to imagine there is a God. If this God could see what we are doing on earth now, and had messages for us, what do you think they would be? They rough out three ideas each. The next page has some prompts for this activity that make it simple to start.
- 2a **Many worlds?** The theme of aliens landing on earth is a staple of science fiction – can you list 10 sci-fi films that do this? These might include *The Day After Tomorrow*, *Close Encounters*, *Alien vs Predator*, *ET*, *Independence Day*, *2001: A Space Odyssey*, *War of the Worlds*.
- 2b **Why is this kind of speculative movie plot so popular?** What visions of humanity do you see in these movies? Does every sci-fi 'other world' offer a theology in some ways?
- 3 **Contact: using a movie:** See the ideas on the next page for one way of using a movie to explore the issues Russell Stannard refers to in his thinking on ETI.



Questions and quotes

'Perhaps it is the fate of all intelligent species to destroy themselves when they discover nuclear power.'

'The only practical approach to finding ETI is to search the sky for signals: the SETI programme is searching, but finding nothing yet.'

'If God created our life, then he could create life in any form in any other part of the universe as well.'

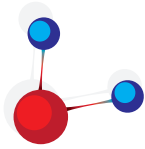
'It takes a certain level of intelligence to even formulate a question of a spiritual nature – "What is the purpose of life?" for example. Gnats and rats don't seem to ask this kind of question.'

*'If there's life on other planets
Then I'm sure that He must know
He'll have been there once already
And died to save their souls.'*

Larry Norman, Christian rocker

A survey in the USA found 3 per cent of citizens believe they may have been abducted by aliens. That's 9 million people. Do alien abduction stories show that these people are crazy? Or is their narrative similar to superstitious belief in witches, demons or even God?





Activity 1 A new message from God

Ask students to join in this thought experiment by selecting five of these prompts and completing them, then sharing their ideas round the group. If God sent a messenger to the earth today (imagine she is a female messenger) then I think ...

- She would like ...
- She would criticise ...
- She would be welcomed because ...
- She would say...
- She would change ...
- Some people would not like ...
- She would tell us ...
- She would use TV and the internet to ...
- She would praise ...
- She would judge ...
- She would open our minds to ...



Activity 3 Contact

In the 1997 movie *Contact*, based on a science fiction novel by Carl Sagan, Jodie Foster's character Ellie is chosen to try to travel to a distant planet from which a signal of life has been received. She has an amazing experience which she describes as a 'celestial baptism of beauty' in the awesome universe. She comments 'they should have sent a poet'.

Transcendently amazed, changed to the core, she returns to earth with a fresh sense of the love at the heart of all things and the beauty in which it is expressed. To her amazement, it is revealed that her spacecraft never left the ground due to a malfunction. She is sure of her vision, but cannot back it up with any verifiable science. She finds herself in an uncomfortable position: can she defend the transforming vision of love and beauty she experienced, or is it illusory?

The film offers thoughtful lines of enquiry into the topic of our series of programmes: the nature of possible relationships between science and belief.



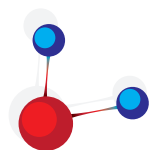
Questions

- 1 You and your partner are approached by a movie maker who wants to create a new story in the sci-fi genre that poses questions about whether we are alone in the universe. Rough out a story, plotline and style together, and pitch your idea to the rest of the group.
- 2 Jodie Foster's character argues that our human experiences of love, transcendence, beauty and unity at the heart of all things are valuable, but not scientifically verifiable. Does this make sense?
- 3 Is religious experience open to experiment, or is it purely private?
- 4 Would you be open to being abducted by aliens, or if this happened to you would you conclude the experience was an illusion?
- 5 Would you be open to hearing the voice of God, or if this happened to you would you conclude the experience was an illusion?



Programme 8

Round table 2



Summary

The round-table discussions in *Science & Belief: The Big Issues* use our community of college students taking A levels to explore, summarise, clarify and refine understanding.

The discussion begins by asking whether we need explanations for all our mysteries. Is it naïve to say that we need no explanation of the origin or purpose of our lives? Can we simply 'let the mystery be'?

Could God have set up M theory (the multiverse idea) to create trillions of worlds? The ancient writers of scriptures experienced the deep mysteries of the universe as we do. Is there an authoritative answer to any of our questions? Is scientific authority, or religious authority, really a possibility?

Our ability to think, to be amazed, to question, to pursue scientific understanding, might make a link between science and religion: more humility on both sides might make this link.

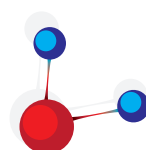
As for aliens and ETI, then the likelihood of life beyond ours is hard to establish presently, but certainly keeps open the 'horizon of wonder' at the edge of our knowledge. To the aliens, we are the aliens!

Would ET be religious? If aliens were God-believers, would they convince anyone here of this idea? Or vice versa?



Activities

- 1 Watch/pause/guess:** Give one person in the group control over the pause button. Invite them to stop each time one of the group has delivered half a sentence, and nominate someone else in the group to guess how the sentence finishes. This is fun, but also tunes the group in to the flow of ideas in the programme.
- 2 Agreeable people?** The participants in this discussion were Michael, Rachel A, Shaal, Sinead, Gordon, Sian and Lucy. Who did you most often agree with?
- 3 Six beliefs you really disagree with:** The writing frame on p.24 asks students what they disagree with. It can be very clarifying to state your opposition to a view or opinion and say why. After they have seen this second round-table programme, ask your learners to fill in the sheet, then compare notes – first with one partner, then in their own round table. Can they help each other to clarify exactly what they believe? Give one person the key role of chair of the table, to bring everyone's views out clearly.
- 4 Science and belief: what do you think?** A discussion game where students clarify their own ideas and beliefs is outlined on p.25, with board and playing cards on pp.26-27.
- 5 Applying beliefs:** Ask students to consider the three statements by atheist, Muslim and agnostic scientists on p.28 and select from the cards (p.27) which three they think these scientists would be likely to agree with and disagree with the most. They work in pairs to explain their choices, and then write a similar speech outlining their beliefs.
- 6 Science and belief: using the frame** Using the writing frame on p.30, students give their own five top ideas about science and belief. The activity is outlined on p.29, along with an extension activity.



Questions and quotes

'Accept the fact that the universe just is: it grew by itself.'

'Curiosity is part of our nature: humans always look for more answers, it's one of the splendours of our existence that we search and discover.'

'Don't be content with ignorance. Humans are better than that.'

'If there was a God, then he would intend the creation. Could God have set up the initial conditions of the universe so that life in some form would emerge somewhere?'

'Scientists have a kind of empirical authority, but the authority of the Bible is more than that, of a higher order, if you believe it.'

'If God has given us a sense of purpose, isn't that better evidence for God than an unprovable argument about what happened 13.7 billion years ago?'

'Here we are. We think. We are amazing. Why? Amazing!'

'The multiverse theory is as much an idea of faith as the god "theory". We all have to use faith, speculation and hypothesis. Religion and science are closer than they sometimes look.'

'Human self importance makes us deluded about our place in the universe.'

'Remember that to the aliens, we would be aliens.'





Activity 3 Six beliefs you really disagree with

Here's one I really think is wrong:

Here's my first reason:

Here's my second reason:

I've been influenced by:

This is something I disagree with:

Because:

And I also think:

Something else I disagree with:

Because:

And I also think:

I don't agree with this one:

My main reason is:

What I believe is:

I don't agree with this one either:

My main reason is:

What I believe is:

And I don't agree with this one:

My main reason is:

What I believe is:



Activity 4 Science and belief: what do you think? A discussion game

The aims for the activity are to enable students to:

- think for themselves about the nature of scientific understanding, religious understanding and belief
- discuss issues of evidence, origins, meaning, destiny and truth, thoughtfully in a small group
- clarify their own ideas and beliefs through reasoned conversation
- think carefully about the big questions of science and belief.

Practicalities

This activity works best in groups of four. Fives are also workable, but six is too many and three is too few. For a group of 30, you will need to make eight copies of the game board and playing pieces. Cut up the discussion cards on p.27 and put a set in an envelope for each group of four players. Mixed and unusual groups are positively good for this game. Allow about 25 minutes to play the game, then about 90 minutes if you want to do most of the follow-up work. This can be 'chunked' into two or three more lessons if you like, alongside the *Science & Belief* videos.

Curriculum relevance

The game is purpose built to address questions of science and belief which students of Standard and Higher grades, GCSE and A level consider as part of their syllabuses.

How to play this discussion game:

- 1 Put the cards in a pile, face downwards in the blue rectangle. Play in turns, around the group.
- 2 Green squares stand for ideas you agree with strongly, an orange space is for things you're not so sure about, and red squares are for points of view you definitely don't share.
- 3 When it's your turn, you must do three things:

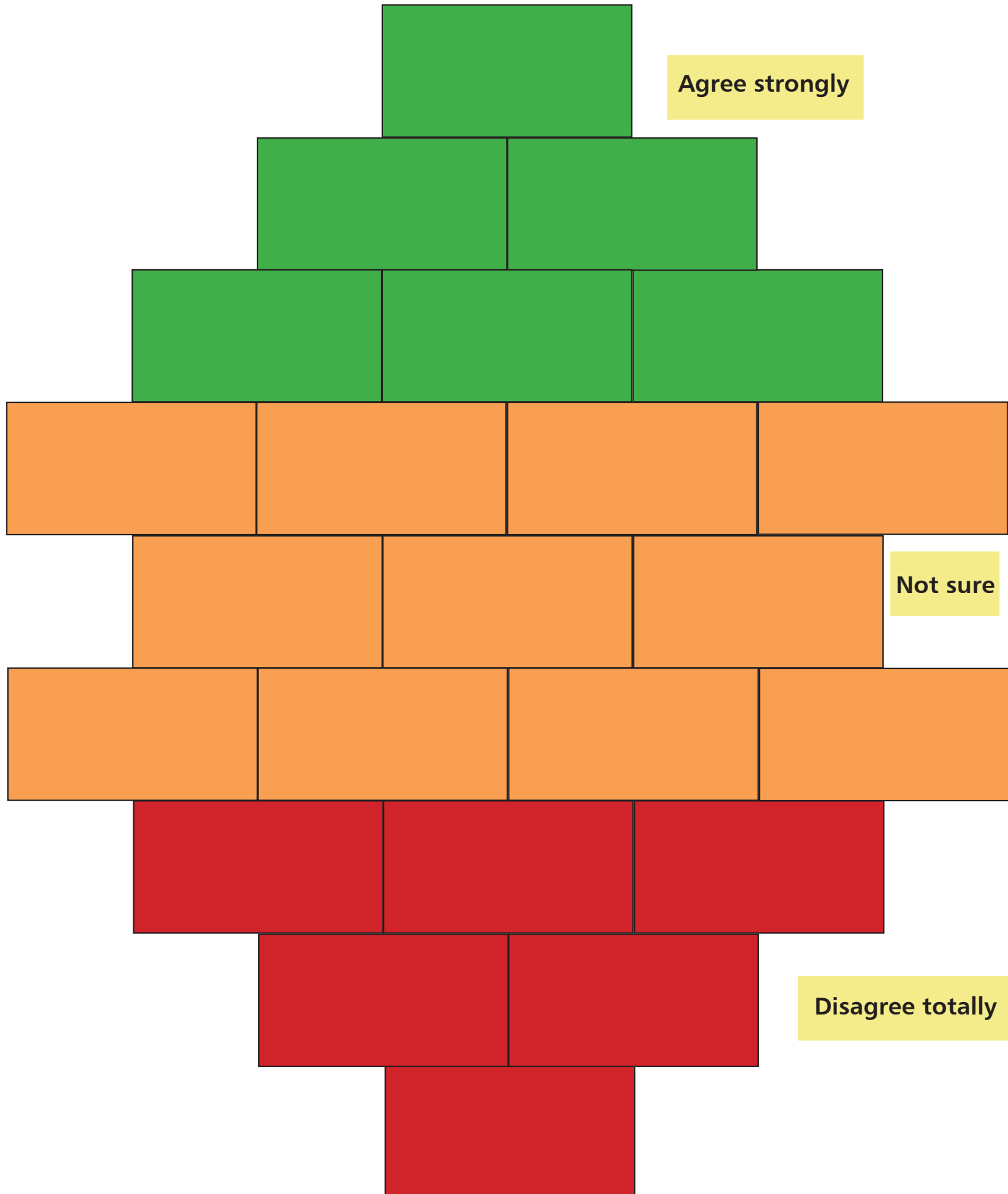
- a **Read out** the top card
 - b **Ask the other players** where they would put it and why
 - c **Ignore them**, and put it where you think it goes for you.
- 4 When it's your turn, if you want to, you can also move another person's card to a space that you choose: **'Move one, place one'** is the rule.
- 5 All cards must be in one space only – **no overlapping** is allowed.
- 6 The tab full of question marks is for a statement of your own.
- 7 When the cards are all out, play three more rounds, in which you take turns to just **swap two cards** over. Say why.

Using the discussion strategy more than once

Note that it would be possible to create two more sets of cards to go with this discussion activity, which address the differing areas of debate in three of the other programmes in this series. A good way of doing this is to ask students to take the lead in creating a set of 24 cards that list and express the opinions covered in the programmes. They need to write from 'both ends' of the argument – so 12 they agree with and 12 they reject.



Science and belief: What do you think?





Science and belief: ideas to consider

Each card finishes the sentence 'I think ...'

... in arguments about science and belief, too many people claim to have proof.	... a myth in the biblical sense (e.g. Genesis 1) is a narrative to address deep questions.	... human free choice is real: we are not determined by genes or by God.	... I'd rather believe God's truth than Darwin's theory.
... meaning in biblical story is more like poetic meaning than scientific meaning.	... the universe was made in six days by Almighty God.	... the universe is about 13.7 billion years old.	... the Bible's creation stories have the same status as fairytales.
... the value of the Christian creation story is nothing to do with science.	... we owe our very existence to God.	... a 'miracle' is not just a long-odds coincidence, but an act of God.	... Genesis is false. Sorry, but there's no evidence that it is a true story.
... most early church leaders saw Genesis and creation as non-literal truth.	... the universe began with a big bang and that began from the mind of God.	... science can explain everything. We don't need God to fill the gaps.	... Genesis taken literally: worthless. Take it symbolically and it's valuable.
... you feel free, but you're not. Genetic forces control your every decision.	... co-operation has evolutionary survival value: morality is part of evolution.	... evolution is the process God uses to design things – including humanity.	... religion and science are enemies, not partners: and science is winning.
... the universe seems more like a design than an accident.	... there is evidence for God, but no proof.	... any partnership between religion and science must be based on evidence not faith.	???

Afterwards: teaching and learning strategies developed from the discussion game

- Ask students what five statements they most agree with. Why are these more important than some others?
- Ask students which five things in the game they definitely disagree with and why.



Activity 5 Applying beliefs

Consider the three statements by atheist, Muslim and agnostic scientists below and select the three cards which the atheist, Muslim and agnostic would be likely to agree with and disagree with the most. In pairs, explain your choices. Can you write a similar speech – no longer than 200 words – about your ideas and beliefs?

Atheist scientist: The power of science in every field of human enquiry is shown by its technological application. The physics of electricity now lights the world, the progress of biochemistry in areas like fertiliser and seed technology feeds the world better and the medical might of chemical understanding cures the world of diseases that have frightened and killed us for centuries. These and many other applications of science give authority to the observed and argued theories of astrophysics, about the Big Bang, and of evolutionary biology. The progress of human scientific enquiry is speeding up.

No religious enquiry, no so-called spiritual progress delivers the goods like this. I try to live my life based on evidence of what is true. To me the 'evidence' for God is not conclusive, or even compelling, but the evidence that scientific enquiry tells us the truth is very compelling. So I give my time to science and I live happily – and I hope morally – without the idea of God.

Muslim scientist and believer: My understanding of science and the revelations of the Qur'an are in harmony. Allah is revealed in the Qur'an as creator, designer, maker and sustainer of the world. One of Allah's 99 Beautiful Names is 'the Evolver'. My scientific work is all about observation, experimentation and critical testing. These abilities are given to me, says Islam, by Allah my creator, and I must seek to use them for the good of humanity and the service of Allah.

This brings a moral focus to my scientific work: I try to apply my learning and experimentation to the good of humanity, with honesty and humility. This is not always easy, but it means for me that being a good scientist and being a good servant of Allah are integrated. That's how I want to live. I understand that some people find conflict between God and science, but for me the Qur'an is a perfect revelation, and what science shows us is in harmony with it.

Agnostic scientist: I've worked in medical physics for most of my career, and I'm very proud to be associated with some new drugs that make a good contribution to controlling the pain of arthritis. When I was younger, I was a believer in God, but never a very fervently religious person. I think I used to believe because I found it comforting to think of 'God with me' and to hope for life beyond the grave. Over the years, particularly when studying the ways arthritis attacks immune systems, I had to question whether this universe and our human bodies seem to have been designed by a good God. The only honest thing to say is that this is a mystery to me. I don't find the 'aggressive atheism' of the twenty-first century at all appealing, but I can't say that it looks likely to me that a good God created or designed bodies that go wrong, wither and die as ours do. I think it could have been done better. So although I am sometimes wistful for the faith of my youth, today I see myself as agnostic about the question of God. Would any evidence convince me, one way or the other? Hard to tell. If when I die I meet Jesus – or Guru Nanak – then perhaps I'll have got off the fence. Hope it's not too late then!



Activity 6 Science and belief: using the frame

Try this:

- Give each student a frame (p.30) after playing the discussion game, and get them first to fill in column one, about the five ideas they most claim as their own (they can make up some of their own too).
- Ask them to discuss this with a partner, then fill in column 2, explaining reasons for their beliefs and ideas.
- The ideas of a fellow student who has very different views can be used to fill in the third column to challenge the reasons and ideas given.
- Of course the process of dialogue might continue with the addition of a further column in which the disagreements are explored further.

Extension activity: a legal style of debate

M'Lud ...

Tell your students that the job of a defence barrister in a court of law is to put forward the best possible case on behalf of their client, regardless of their own view of the client's innocence or guilt. Ask them to defend a view they disagree with in this way.

Each student should take the statement they disagree with most strongly from the discussion frame, and imagine themselves in the role of the barrister, defending this idea. They are to plan a short speech (maybe just ten sentences?) that makes out the best possible case to a jury – obviously made up of the other members of the group.

This activity aims to ensure that students understand the force and vitality of positions and arguments that they disagree with.



My own top five ideas about science and belief

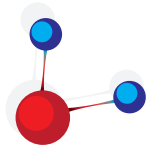
My top five ideas	Some reasons and arguments that support my views	Some points made by those who disagree with me
1		
2		
3		
4		
5		

Use the writing frame to collect your ideas and to clarify the reasons for your opinions.
Compare your sheet with others in a group and see if you can improve your reasoning.



Programme 9

Psychology



Summary

This programme equips learners to consider and respond to these questions:

- Who do you think provided the more accurate assessment of religion: Freud or Jung?
- Is it helpful to regard either religion or atheism as a mental virus?
- Do we have free will?

The idea of religious belief arising from desire, as wish fulfilment, is attributed to Sigmund Freud, father of psychology. He describes religion as akin to an infantile delusion.

Religion is comforting for some, challenging for others. So Freud's account may be partial, rather than comprehensive. C G Jung offered a contrasting psychology in which the image of God is at the core of the healthy personality.

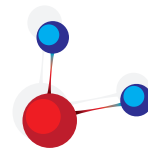
Richard Dawkins describes religion as a harmful virus, transmitted from parents to children, infecting generations: but might the opposite be just as arguable? Atheism as the virus?

The possibility that free will is illusory is also explored in this programme: when we experience choice, is that freedom, or delusion? Brains, physical, are determined – but is the mind un-robotic, free to choose? How can you tell?



Activities

- 1 What's next? Predictions:** Guessing what's going to happen next is a powerful tool for engaging with an argument, and it provides a good way of using curiosity to drive learning. In this episode, ask students to watch the first section (3 mins 5 secs – up to Alexandra's quote – is a good break point). Then write down what they think will finish the episode off. You don't need a big prize to make students watch the rest – curiosity does enough.
- 2 Psychology by accident?**
Discussion activity: The series has often come back to the question 'Do you believe in accidents or purposes?' This question takes on a particular form with reference to psychology: do you believe that every human thought is a random-generated thing? If so, where can meaning be found? Do you believe that every human thought is pre-determined by the chemical, physical brain? Why then do we feel so stubbornly that we choose freely?
- 3 Paper the walls:** This activity is described on the next page.



Questions and quotes

A Freudian description of religion is that it's a neurosis – a childish delusion. The characteristics of 'the god I believe in' may be explicable in relation one's own father or parenting.

A Jungian description suggests that human maturity leads beyond mere belief in God to knowing God.

Why Richard Dawkins is the best argument for the existence of God:

'Could a witless miasma of molecules and dust ever have created anything as ingenious and incredible as Richard Dawkins? I don't think so, but I'm prepared to listen and tolerate any theories and arguments, a concerto of contemplation, a requiem of speculation, to divert us till we know the truth.'

Russell Brand





Activity 3 Paper the walls with your wisdom: questions of psychology, miracles, science and belief

Sixteen starting points

- 1 Faith in God is for weak people because ...
- 2 I think God is a projection of our imagination because ...
- 3 I think it is healthy to believe in God because ...
- 4 The best explanation for the fact that over 75% of people believe in God is ...
- 5 If you believe in God, then ...
- 6 If you are an atheist, then ...
- 7 Psychology can explain religion because ...
- 8 'Humans created God in their own image.' This means ...
- 9 I have heard a credible miracle story:
- 10 Miracle: what this word means is ...
- 11 God can't do miracles because ...
- 12 God can do miracles because ...
- 13 For me to believe in a miracle, I would have to ...
- 14 I believe we are determined by our genetics, and freedom is an illusion because ...
- 15 Humans are free. I'm sure of this because ...
- 16 I also want to say ...

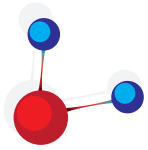
Use the 16 prompts in the left column like this:

- Before the lesson, write each prompt on the top of a sheet of A3 paper, and stick them round the classroom walls.
- As students arrive, give them seven sticky notes each.
- Draw their attention to the prompts (a whiteboard slide of them is good) and ask them to think about the topics of psychology of religion, free will and miracle.
- Ask each pupil to choose seven out of the sixteen prompts on which they have something to say and write their thoughts – anonymously – onto their sticky notes. They can do up to 30 words per note.
- Then the 'thought notes' can be stuck to the relevant sheet. This is a great way of getting 210 'theological thoughts' from a class of 30 students in ten minutes. It enables everyone to give many ideas swiftly and with diversity – they don't copy much.
- Put the students into twos or threes, and give them a sheet from the wall to look at, and summarise as a report to the class. They can pass the sheets round if you prefer that to a 'talk back' plenary.
- Follow this up with a writing task done alone, using a question like this: What diverse views in your class do you disagree with about psychology of religion, free will or miracles?



Programme 10

Miracles and the laws of nature



Summary

This programme equips learners to consider and respond to these questions:

- According to the scientific outlook, are miracles possible?
- Do they actually happen, or are they just superstitious fairy tales?
- Are they stories illustrating spiritual truths?

Approaching the miracle stories of any sacred text might begin by asking what this could have meant in its own day, and what it might mean in our contemporary understanding.

Interpretation might lead to some stories being set aside: stories of demon possession re-interpreted as psychological cure for a mental illness, for example. But are there miracles that matter? For Christians, the incarnation and resurrection are pretty important. For Muslims the giving of the holy Quran is a stand-out miracle.

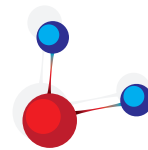
Clearly, miracles in an earlier age were seen as a support to faith, but in modern times they have become, for many, an obstacle to faith.

Russell Stannard suggests that miracle stories might sometimes be the object of exaggeration, legendary inflation, but that these stories might also be open to useful interpretation for the spiritual insights they carry.



Activities

- 1 **Who reads this stuff? Reviewers for fixed audience:** Where you write and whom you write for influences a review. Ask students in groups of four to write a really short review of this programme (under 100 words) for four different journals: the 'Atheist's Gazette', the 'Christians Chronicle', the 'Muslim Daily' and the 'Agnostics Times'. Compare the reviews they write, and consider: how does our audience change our perspective?
- 2 **Look at some miracles afresh:** Read and consider what three miracle stories actually claim. Try three from the Christian tradition: Jesus makes wine out of water (John chapter 2); Jesus heals ten people suffering from leprosy (Luke chapter 17); and the Feeding of the 5000 (Matthew chapter 15). For each of the three, clarify whether laws of nature are broken here. What natural explanation could be given for the story? And what spiritual lesson does the story seem to imply. Does the miracle matter? How and why?
- 3 **The unbreakable cup:** If there was an almighty God, could he make an unbreakable cup? If he did, could he break it? Drawing conclusions: 'If God wanted to, then he could break his own laws' – but why would he?
- 4 **Miracles: are they probable?** a critique of an argument – see next page.



Questions and quotes

Does a miracle have a spiritual meaning? In sacred text, almost certainly, almost always. So does it matter whether the story of the miracle is a myth, a fable or the historic truth? Can you just take the spiritual lesson and leave the rest?

C S Lewis, a firm believer in miracles, says this: 'You don't make sense out of nonsense by putting the words "God can ..." in front of it.'

'Science may prove that miracles cannot happen.'

Do you agree? How could science do this?

Is superstition, mass hysteria, magic or illusion always a more likely explanation than any event that breaks the laws of nature? Or is it better to say a miracle is an interpretation of events that reveals God to a believer?

Karl Popper alerts us to the idea that a scientific proposition cannot be proved. It can be falsified, though. Validation is the crucial issue, and science makes sense precisely because all scientific statements might be shown by a repeatable method to be false.





Activity 4 Miracles: are they probable?

What definition of a miracle does C S Lewis seem to be using?

Why is historical probability important when thinking about miracles?

What is your definition of a miracle?

C S Lewis, famous for his Narnia books, was also a Christian apologist. In this quotation he argues for miracles:

The ordinary procedure of the modern historian, even if he admits the possibility of miracle, is to admit no particular instance of it until every possibility of a 'natural' explanation has been tried and failed. That is, he will accept the most improbably natural explanations rather than say that a miracle occurred. Collective hallucinations, hypnotism, widespread instantaneous conspiracy in lying by persons not otherwise known to be liars, all these are known to be improbable: so improbable that, except for the special purpose of excluding a miracle, they are never suggested. But they are preferred to the admission of a miracle.

Such a procedure is, from the purely historical point of view, sheer midsummer madness unless we start by knowing that any miracle whatever is more improbable than the most improbable natural event. Do we know this?

From *Miracles* by C.S. Lewis Pte.Ltd.1947, 1960. Extract reprinted by permission.

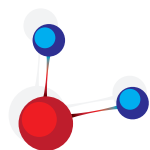
How do you answer C S Lewis's final question in the quote?

Is anything more improbable than a miracle? Why/why not?



Programme 1 1

The relationship between science and religion



Summary

This programme equips learners to consider and respond to these questions:

- Are science and religion in conflict?
- Are they separate, independent?
- Do they interact with each other?
- Are they engaged in a common search for understanding, that is, are they potentially integrated?

Galileo was persecuted by the Church for affirming the truth that the sun is the centre of the solar system, rather than the earth. He was forced to recant these beliefs on his knees, although perhaps he did not really believe his recantation. The history was complex: maybe more of a squabble than the mighty clash it is sometimes seen as.

If religious belief is reinforced by tradition and literalism, is it essentially conservative? Is it always under threat from progressive science? Or are there more fruitful ways of characterising the relationship between science and belief?

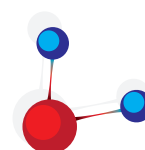
Four models of the relation between science and religion are outlined.

Insight from faith and religion, and challenges from science to religious tradition, suggest there can be a view both ways that is positive.



Activities

- 1 Sound but no visuals:** Get students to listen to the soundtrack of the programme, but not to see the imagery. Ask them from their understanding to suggest what images or visuals a producer should use to convey Russell Stannard's ideas. Then show them the whole programme, and see if they guessed it right – or were their ideas even better? This stimulates thinking about how the ideas are communicated.
- 2 Bedfellows or enemies?** This series of programmes explore how science and religion are often seen as complementary studies by religious scientists, but as enemies by atheist scientists. Ask students to write a note to either his Holiness the Pope, or the leader of the British Humanist Association, saying what they think about the relationship between religion and science. Should religion get into bed with science? If it does, can it be a happy marriage? Or should the two ways of seeing the world be divorced today, because of irreconcilable differences and violent behaviour? Then ask students to compare their notes with others in the group. What do they notice?
- 3 Relating science and religion:** Page 36 includes a writing frame in which students can note the main points of each of the four different models of the relation between science and religion.



Questions and quotes

Among early members of the Royal Society were clergy and theologians – including Sir Isaac Newton. They thought a religious outlook on life might lead the believer to exploration of God's universe.

'Organised religion typically seeks to hinder, curtail and inhibit scientific progress through persecution.'

The history of science shows that it makes fast technological improvements to life, and that is good. But the technological application of science also shows that spiritual thought to enhance the mind is needed to direct scientific progress in ways that are good for all humanity.

'Religion on the one hand and science on the other are too far apart, too-different worlds. But they do have something to offer each other.'





Activity 3 Relating science and religion

Four ways of relating science and religion: what does each box mean? Who takes each of these viewpoints? Write your own notes into each box to summarise the four views.

Conflict? Is there always a fight between science and religion?

Independence? Are science and religion nothing to do with each other?

How are religion and science related to each other?

Interaction? Can science and religion learn from each other?

Integration? Do science and religion both fit together in human understanding?

Peer educators, researchers and thinkers

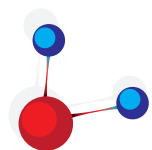
Students aged 14–19 who have tried it say that explorations of the issues of science and belief with younger pupils are very interesting. This idea has the added advantage of improving team skills. Ask your students to work in pairs or threes, and to choose one of the DVD programmes. They are to take a group of 5–8 younger students (11–13-year-olds would be ideal) and watch the programme with them, then help the younger students to understand the difficult parts of the programme. They might use or adapt any of the activities in this booklet.

When this activity has been completed, arrange a discussion time for the senior students to share what they noticed about the views, assumptions, different perspectives and ways of working of the younger students.



Programme 12

Round table 3



Summary

Students discuss the nature of human freedom, ranging across examples from Derren Brown to selecting new clothes. The question of definition proves problematic. For example, God's knowledge of what you will choose might be a distinct idea from a controlling God determining your 'choices'.

Theologically, if God is 'the writer of our paths' then why does he write bad paths for some people?

If human free will is seen as another product of time plus chance in evolutionary progress, then does that reinforce the possibility that this 'freedom' is just an illusion of the brain/mind?

If freedom is, by an alternative view, a gift of God, then it follows logically that God's power is restricted by his gift. Giving freedom means giving up control.

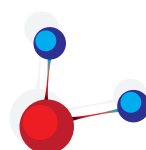
The four models of relation between religion and science are discussed. The persistence of each of the four models – conflict, independence, interaction and integration – finds support from some members of the group.

There is a recognition that, for example, Richard Dawkins is a preacher of a 'religion' quite as vehement as some of those he opposes. And of the sometimes constricting ways religious people can respond to adventurous scientific discovery.



Activities

- 1 **Looking back:** This activity helps students to review the work done with these video programmes and the associated activities. Three tasks to focus their thinking:
 - a Choose **five words** that sum up the main learning points of the series from your point of view.
 - b Write **five sentences** that explain your own point of view on the issues covered.
 - c Jot down **five questions** about science and religion which you think should be covered in the school curriculum.
- 2 **Looking forward:** If students could make two new programmes to continue this series, what two questions would they want them to address? What would they put in them? They have 6–8 minutes to rough out their scripts, then compare notes with other people.
- 3 **Whom do you agree with?** This round-table discussion included opinions from Gordon, Shaal, Lucy, Jonathan, Alexandra, Alex, Sinead and Rachel A. Who was closest to, and furthest from, their own perspectives?
- 4 **Your own round table:** If pupils have learned a lot from the programmes, then organising (and possibly filming) their own 'Round Table' discussion is a valuable activity.



Questions and quotes

'The brain makes a decision in a predictable way. We feel free, but we're not.'

'Scientific determinism is really surprisingly similar to the religious doctrine (found in some forms of Islam and Christianity) that God predestines all the details of our lives.'

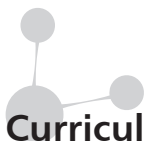
'A young boy with terminal cancer, after prayer, was healed. There's no doubt about the diagnosis, and I know the family: I know he is well now. No one can say how it happened, but we believe it was a miracle.'

Can this belief be tested, proved or disproved?

'The word "miracle" is only really useful in the context of religious debates. It's not just meaning "highly improbably" or "unexplained". The meaning is an act of God.'

Miracle stories can be controlling: perhaps some such stories are faked or exaggerated by people who wish to 'manage' the behaviour of others through this kind of 'power narrative'?





Curriculum links

The series connects with different RS syllabuses in many different ways.

GCSE in England and Wales

AQA Syllabus B Unit 4: Religious Philosophy and Ultimate Questions

WJEC Specification A: Christian Philosophy and Ethics

Edexcel Syllabus B: Religion and Life – Believing in God

OCR Specification B Unit: Religion and Science

A level and 16–19

Awarding bodies offering Philosophy of Religion and Theory of Knowledge options include in England: AQA, OCR, EdExcel. The programmes are relevant to many topics including: philosophy of science and religion, design and causation arguments for the existence of God, the problem of evil, atheist critiques of religion, Kant and the moral argument.

Scotland: Standard Grade and Higher Study in Religious, Moral and Philosophical Studies (the unit on Christianity, Belief and Science).

Other courses where some of the programmes can be used:

A level Critical Thinking

International Baccalaureate Theory of Knowledge



Concluding activities

1 In a novel or a movie: One way of picturing the religious vision of God in the universe is to see God as an author with the universe as his novel. He writes the early history in just a few lines or pages, then the timescale focuses in on the early spiritual lives of ancient humanity, and the story gets more detailed. This might be a god metaphor because it sees us as characters within the novel, made by God. But many novelists report that, as they write, their characters take on a kind of life of their own, and the story flows and moves in ways the author may not have prepared. Authors – like God – write the story, but the characters move freely within the pages of the action, dialogue and relationships.

With a partner, students consider this metaphor: could God be like an author to the universal novel, a director to the universe's movie? They list the ways in which the metaphor might work, and consider where it breaks down. After 10 minutes in pairs, they spend 20 minutes sharing their insights in the wider group.

2 Any changes of view?

The opening activity from p.4 asked learners to fill in an initial questionnaire. You might get them to do this activity again, then give the originals back to students at the end of their course. How have views and ideas been developing and changing? What has influenced, challenged or confirmed their ideas?



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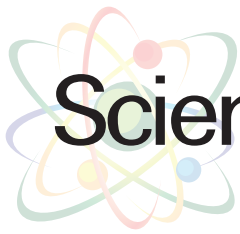
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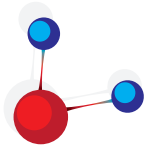
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Science & Belief: The Big Issues



Descriptive glossary

Agnostic: a person who is unsure about the reality of God, believing that the evidence is ambiguous or insufficient to decide for theism or atheism.

Altruism: an ethical stance that values love or unselfishness, acting for the good of others even if one's own good is not served.

Analogy: a way of arguing that notices similarity and develops a case by comparison, e.g. is God like a movie maker? Is the progress of evolution like a river flowing in a valley, rather than wholly random? Analogy cannot prove a point, but may clarify a claim.

Anthropic principle: the recognition that for life to have developed, certain physical conditions had to have been satisfied, and, on the assumption that there is only the one universe, this is most unlikely to have happened purely by chance.

Apocrypha: contested ancient books excluded from Christian scripture which are not accepted as canonical or divinely inspired in the same ways as those in the Bible. These books are still regarded as of value, but not given authority like the canonical biblical books.

Apologetics: the defence of the faith, in Christian tradition. Arguing and explaining Christian belief to non-believers, giving reasons for faith in God.

Astrophysics: the branch of science that studies the stars and galaxies.

Atheist: a person who believes there is no God.

Authority: a source of knowledge or power, e.g. sacred writings for religious people; evidence, argument and prior learning in science. Some religious people often use evidence and argument too, in relation to debate about God or the universe.

Big Bang theory: this describes the conditions of the early universe about 13.7 billion years ago, when rapid initial expansion of matter from a singular point created the conditions of the universe such as the expansion of space, the cooling universe and the formation of matter.

Consciousness: the human abilities to observe ourselves, to reflect, reason, remember and predict, to be aware and to know that we are finite.

Cosmology: the study of the universe as a whole, through astrophysics and in relation to other sciences and philosophy.

Creationist: a person who believes that the world was created by God according to a sacred text, e.g. Genesis 1, creation in six days; Genesis 2: creation of the Garden of Eden. Creationists prioritise the authority of sacred texts over the authority of human reason or mainstream science.

Determinism: the philosophical belief that despite our feeling of being free to take decisions and actions, human life is predetermined by forces we do not control, e.g. the laws of nature, genetics, the will of Allah, divine predestination.

Darwinism: the theory of evolution as propounded by Charles Darwin, which describes and accounts for biological diversification and change through natural selection or the survival of the fittest. Darwinian evolution is often, but not necessarily, associated with atheism.

DNA: deoxyribonucleic acid is a nucleic acid which carries the basis of all living organisms, a complex double helix of two long polymer molecules which holds the genetic material that makes organic life possible. DNA contains the genetic instructions used in the development and functioning of all known living organisms.

Empirical: based in observable data. Empirical methods of seeking knowledge create replicable experiments or studies and base ideas about knowledge on observable data.

Evidence: data and observations used to support an argument. Evidence may be stronger or weaker, and is open to interpretation. Evidence can lead to overwhelming probability, but proof is usually confined to matters of logic.

Evolution: the biological theory that describes the development of life on earth over millions of years through natural selection and the survival of the fittest.

Extraterrestrial intelligence: literally, intelligence beyond planet Earth, usually the idea that there might be intelligent life on planets orbiting other stars, that is, extra-solar planets, known as exoplanets.

Falsification: the opposite of verification. To falsify a proposition or statement is to show it cannot be true. One critique of theological ideas asks whether they can be falsified, and if they cannot, their meaningfulness may be questioned: 'if it's not falsifiable, then it doesn't mean anything'.

Genesis: literally means 'Beginnings'. The first book of the Christian and Jewish Bible, in which creation stories of God making the world in six days, planting a garden, making the first humans out of clay, are found.

Genetics: that aspect of biological science that studies the molecular structure and functions of genes in cells or organisms.

'God of the Gaps': this theological fallacy argues that gaps in scientific knowledge are evidence for God's reality. All such arguments are diminished by increasing scientific discovery, and imply an over-reliance for belief in God on teleological arguments.



Intelligent design (ID): the idea that certain steps in the evolutionary chain leading to humans were too great to be bridged other than by the direct intervention of God. ID ideas are a contemporary form of the teleological argument for the existence of a God or higher Mind in the universe.

Laws of nature: regularities and constants in the observed universe that scientific enquiry can build upon. Such laws are true in the universe as a whole and unchanging. But scientific enquiry may revise human understandings of laws of nature, e.g. Einstein's description of gravity superseding that of Newton.

Meme: Richard Dawkins coined this idea to describe concepts or patterns of thought communicated culturally down generations of humanity. He argues that, for example, the idea of God is a meme without a reference point in reality.

Metaphysics: the philosophical study of questions about the fundamental nature of being, considering ideas which are beyond the physical or material, e.g. Does the soul exist? or questions of God.

Miracle: strictly speaking, any occurrence that could be interpreted as God revealing himself in a special way. More commonly, the term refers to those events that would have required a supernatural act of God, or an intervention in the world that comes from God's will. For believers, miracles can be a support for faith, but for atheists they may be an obstacle to belief about God. Key question: if God made the laws of nature, can he or would he break them?

Multiverse: the idea that this observable universe is one of many. The others cannot be observed from within this universe.

Myth: a sacred story of gods and humanity with the function of explaining meaning and purpose in life. Ancient Greek myths, not believed as fact by anyone today, can make the term appear dismissive, but some Christians might accept that their

sacred stories are mythic in a positive way, e.g. the stories of Genesis 1–3.

Predestination: the Christian doctrine that God determines our destinies in advance of our birth. This leads to determinism, the idea that we are not free to act for ourselves as human beings.

Proof: a logical proof is established by a formal argument and is to a 100 per cent standard of certainty. This is different from, e.g. a legal or historical proof which might be to a standard 'beyond reasonable doubt'. The concept of proof is to be cautiously used in debates about religion and science!

Psychology: the study of human behaviour and the mind both as individuals and in groups.

Religion: a religion is a view of the world based in beliefs, symbol, practice, community and spiritual life. Religions usually include sets of beliefs about life's meanings, purposes, virtues, origins and destiny.

Revelation: the idea that there can be communication from the Divine to the human. Different religions claim revelation variously through, for example, miracles, sacred texts, inner life or community life. In the debates about science and religion, claims to revelation include the idea of natural theology, that God is revealed in the cosmos or the earth.

SETI: the search for extraterrestrial intelligence. This covers a number of scientific and research-based ways of exploring beyond our planet for signs of life and intelligence.

Science: the human enterprise of seeking knowledge through observation. Experimental science uses replicable tests to gather evidence, leading to the formulation, testing and systematic understanding of the world/universe.

Secular: separate from religion. This can refer to an institution (secular state, school, radio station) or to a viewpoint (ideas about society, human rights). Secular ideas may favour the separation of religion from politics, for example, while not necessarily being anti-religious.

Teleology, teleological argument: From the Greek word 'telos' meaning 'purpose', teleology is any kind of philosophical argument that claims the purpose of something can explain it. In the context of arguments about God, cosmology and nature, teleological arguments consider whether the universe or the human race is made for a purpose, or has a purpose. One form of teleological argument for the existence of God argues that since the universe is observably purposeful, there must be a designer to account for the purposeful nature of reality. This, of course, does not lead to a conclusion that the God of Christians, Jews or Muslims is the designer.

Theology: the study of God. The discipline that studies ideas about God and religion in systematic and rational ways.

Transcendent: that which is beyond or outside. In theology, the transcendence of God stresses the idea that God is beyond our universe or our understanding (opposite: immanence, closeness). A non-religious use of the idea might apply to ultimate questions, e.g. Is matter all that matters? Is there a mind beyond the universe?

Verification: showing an idea, belief or proposition to be valid or true. In philosophy, the varied methods by which ideas and observations are verified explore their meaning and test their truth or validity.

Wish fulfilment: the psychological process of satisfying a desire through involuntary thinking processes or patterns; e.g. a sense of insecurity could explain why an individual develops a comforting belief in God, horoscopes or superstition. That this psychological process occurs might explain the existence of the belief, but says nothing much about whether in fact God is real, or a superstition is verifiable.

