

Why Creation Science must be taught in schools

Creation science is a model of how *not* to do science. It is an insult both to the scientific method and to any sensible understanding of the Christian bible. Creation Science is dangerous, misleading and wrong. The best place for it is to be taught in science lessons.

Does this last sentiment has surprise you? Perhaps you strongly disagree that the major alternative to Darwinian evolution should be allowed anywhere near children. In this article we hope to convince you that the best and most useful place for Creation Science *is* in classrooms – but used as an example to help illustrate the principles of the scientific method.

Creation Science – the belief that the literal truth of the bible serves an as inerrant foundation for the sciences - is a relatively recent folly. The influence of the powerful Creationist lobby in America is well known, as are their legal attacks on the teaching of evolution. What is less well appreciated is the rise of Creationism in the UK. Funding and ideological contagion from abroad has been matched by native enthusiasm. Emmanuel College in Gateshead is the first of half a dozen evangelical education institutions which are planned in the north east by an organisation called the Vardy foundation.

News of the way science teaching has been distorted at Emmanuel College leaked out early last year. It was greeted by emotions ranging from despair to apoplexy from the UK science establishment. Notables such as Richard Dawkins have condemned outright the presence in science class of biblically-based theories. But perhaps it is possible to turn the Creationists' insistence of a hearing in science lessons against them.

Out of hand rejection of a Creationist interpretation of biology, however valid, merely appears to justify their complaints of persecution by a dogmatic scientific orthodoxy. The success of Creation Science, in common with that of many other pseudosciences, relies on a number of misconceptions about the nature of science. Not least of these is the

portrayal of themselves as reasonable people raising valid questions which a fearful scientific elite are afraid to answer (rather than as the bunch of ideologically-lead fundamentalists we know them truly to be). Outright refusal by orthodox science to address the contentions of Creation Science can be used to the latter's advantage in suggesting that science is aloof, out of touch and oblivious to the requirements of most members of the public for a spiritually fulfilling account of the world.

This misrepresentation relies in turns on another, deeper, fallacy about science, and one that is common in science teaching as well as many discussions of science in the media. This is the portrayal of science as primarily a body of facts to explained, rather than as process of comparing and testing theories. Presenting science as a body of facts - the speed of light, how vaccines work, the chemical composition of water, etc - allows Creationism to present itself as a better theory than evolution by natural selection because, the claim is, Creationism can explain more facts.

The under-determination of theory by fact means that any set of facts has a infinite number of possible explanations and, by implication, a set of facts that that are only partially explained by one theory can be totally encompassed within another, separate, theory *if we are totally free to invent our theories merely to fit facts.*

What is more, try and argue with a Creationist and they will drag out an endless succession of facts, supposed facts, and speculation that brings evolution into question and presents Creation Science as the solution. Dealing with objections like these provokes an endless regression of quibble chasing which proves little more than the difficulty of falsifying theories which are constructed ad hoc to account for contradictory evidence.

Countering the distortions of fact proposed by Creation Scientists is an important task, and is the ultimate basis upon which the final dismissal of Creationism as science must rest. However, we think you'll agree, most of us distrust Creation Science for more urgent and important reasons. Perhaps the main danger inherent in such microscopic

consideration is that, to the layperson, science and Creation Science start to look like two competing bodies of facts rather than two fundamentally different ways of *thinking about* those facts and drawing conclusions from them. Creation Science violates nearly all the criteria which science uses to distinguish a good theory from a bad theory.

And this is the biggest shame about the exclusion of Creationism from science lessons; in Creation Science, scientists have under their noses a perfect model for teaching what science is and what it is not. One of the most effective ways of communicating the nature of the scientific process is to provide examples of how that process can be abused. The arguments put forward by the Creationist movement and the assumptions necessitated by such arguments are the perfect introduction to a number of crucial scientific concepts (see box 1).

[BOX 1 ABOUT HERE]

Such a drive towards explaining the process of science within the remit of school science lessons would be welcomed from a variety of perspectives. A heavily critical government report, published last year, describes a series of serious flaws in current secondary education science programmes and identifies most of these as occurring at the key stage 4 level (the two GCSE years). Specifically,

“what is important is not that citizens should be able to remember and recall solely a large body of scientific facts, but that they should understand how science works and how it is based on the analysis and interpretation of evidence. Crucially, citizens should be able to use their understanding of science, so that science can help rather than scare them.” (p.60).

It would seem, then, that the government, after consulting with teachers and pupils, would agree that the science curriculum is crying out for a greater consideration of what scientific thinking *is*. There is great potential here for science teaching to get across the excitement of science as a process, and a way of thinking, rather than as a body of dry facts. Interestingly, there seems to be scope *within* the existing curriculum as it stands for a substantial ‘philosophy of science’ component (see box 3)

[BOX 2 ABOUT HERE]

Such curriculum areas seem tailored to a consideration of how *not* to do science as evidenced by the Creationist model. Such a pursuit also more than fulfils the government's recommendations that science teaching should be grounded in 'real world' matters to engage pupil's interest and encourage independent thought. In a world in which, in one of the first cases of Creationist court action, a blueberry farmer and a clergyman attempted to force the cornerstone of most of modern science out of the classrooms of the most powerful nation on Earth, critical thinking skills are one of the most valuable set of abilities that the education system can bestow.

According to a MORI poll published in April 2002, 71% of the public currently expect to receive an 'agreed view' about scientific matters from scientists; 61% expect science to provide '100% guarantees' about the safety of medicines. Such unrealistic expectations stem almost completely from a basic lack of understanding of the scientific method. Addressing this ignorance within the school curriculum would serve society well; this is where Creation Science could be usefully employed in the classroom.

An alternative to open hostility to creationism, then, is to invite it in to classroom with the aim of using it to illustrate the difference between science and pseudoscience. The creation/evolution debate provides an engaging route into the philosophy of science. This in turn can make science teaching more profound than the teaching of an ossified body of facts.

Teaching creation science in schools, if done correctly, would inoculate pupils against the manipulative propaganda of creationists. This is surely a better tactic than trying to prevent them from hearing about it in the first place. To try to ban creation science in entirety merely fuels their conspiracy theory claims that the truth is being suppressed. The scientific method provides a radically more sophisticated way of thinking about truth than creationism, and fair consideration of the two side by side can only reveal this.

Endnotes

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Box 1: Concepts that could be introduced with a consideration of Creation Science:

- *Skepticism*: all beliefs can and should be scrutinised.
- *The Under-determination of theory by fact*: Many theories can fit a set of evidence
- *Parsimony*: The value of keeping theories simple.
- *'Revisionism'*: theories should be revised as knowledge increases.
- *Falsificationism*: the importance of constructing falsifiable theories, how to falsify a theory, and the dangers of non-falsifiable ones.
- *The Naturalistic fallacy*: truth is distinct from the way things ought to be, the way you would like them to be and from what some parts of society might regard as pleasant.
- *Peer review*: its importance in the accountability and transparency of science.
- *Replication*: its importance to reliability, validity and hypothetico-deductivity
- *Use of the word 'theory'*: difference between scientific and lay uses,
- *Confirmation bias*: the importance of seeking disconfirmatory evidence, and of not selectively attending to, or solely seeking, confirmatory evidence.
- *Progression*: the non-static nature of scientific theory, the ability of theories to account for new evidence as a criterion for judgement between theories, the history of science as that of competing theories
- *Post-hoc vs ad-hoc explanation*
- *The value of anomalies to science*: incompleteness of explanation is a strength of scientific theories, not a fatal flaw as Creationists might claim.

Box 2: room for the consideration of Creation Science within the current UK science curriculum:

At key stage 3 (11-14yrs), pupils should currently be taught:

- about the interplay between empirical questions, evidence and scientific explanations using historical and contemporary examples
- that it is important to test explanations by using them to make predictions and by seeing if evidence matches the predictions
- about the ways in which scientists work today and how they worked in the past, including the roles of experimentation, evidence and creative thought in the development of scientific ideas.

At key stage 4 (14-16 years), pupils:

- "see how scientists work together to develop new ideas, how new theories may, at first, give rise to controversy and how social and cultural contexts may affect the extent to which theories are accepted"

They are taught:

- how scientific ideas are presented, evaluated and disseminated (for example, by publication, review by other scientists)
- how scientific controversies can arise from different ways of interpreting empirical evidence (for example, Darwin's theory of evolution)
- ways in which scientific work may be affected by the contexts in which it takes place (for example, social, historical, moral, spiritual) , and how these contexts may affect whether or not ideas are accepted
- to consider the power and limitations of science in addressing industrial, social and environmental questions, including the kinds of questions science can and cannot answer, uncertainties in scientific knowledge, and the ethical issues involved.