



**Ten questions about
teaching evolution
in the classroom**

Nothing in Biology Makes Sense Except in the Light of Evolution



Teaching evolution in the classroom can pose pitfalls for a teacher. What follows are responses to 10 very common questions about evolution and its place in education.

1. Should I teach evolution?

- Absolutely
 - Evolution is as fundamental to the study of biological science as mass, force and gravity are to physical science.
 - Evolution is part of the statutory curriculum for primary science – it is the central tenet of the science of biology
 - In state schools, pupils cannot be withdrawn from the statutory curriculum

2. Should I teach Creation Science or Intelligent Design?

- In short **NO** the DfE guidance specifically does not allow intelligent design or creationism to be taught as science in schools (even in faith schools)
- Intelligent design /creationism is not science
- If you are teaching science, it doesn't belong; humanities is a different story

3. What's wrong with presenting both sides, evolution and creation?

- It might seem “fair,” but just what is the other side?
 - Which creation story is the appropriate one or ones to include in a “fair” accounting of how we came to Earth? Do we use the biblical, Quranic, Hindu, Japanese Shinto, Native American, or aboriginal versions of creation?
 - Do we teach based on the majority religion of an area? If so, are we doing justice to science?
- Consequently, it would be “unfair” to students to present non-science as science.

4. Is evolution a scientific “fact?”

- A scientific fact may be defined as observations or explanations that have been repeatedly confirmed and never totally refuted.
- Evolution fits this description, but that does not mean that new evidence couldn't refine or disprove the theory. Science is a progression, not a destination.
- Paper on scientific terminology

[Williams, JD \(2013\) "It's just a theory": trainee science teachers' misunderstandings of key scientific terminology *Evolution: Education and Outreach*, 6:12 doi:10.1186/1936-6434-6-12](#)

5. Don't a lot of scientists disagree with the concepts of evolution?

- One of the wonders of science is that it is self-correcting.
- Scientists may disagree on the precise mechanism, often violently, (i.e., punctuated equilibrium “evolution by creeps and jerks”), but **the underlying premise is not in question.**

•6. Isn't it better to just de-emphasize evolution?

- No. To diminish or eliminate evolution from the life sciences curriculum makes as much sense as eliminating gravity from the physical science curriculum or atoms from chemistry.
- Evolution theory is central to the modern understanding of life as we see it.

7. Doesn't evolution go against the law of thermodynamics?

- 2nd law of thermodynamics:
 - “in a closed system, things will move from an ordered to unordered state (decay)”
 - The Earth is not in a closed system. New energy from the sun is constantly flowing in
 - Evolution doesn't have to be a “progression.” (e.g. intestinal parasites, loss of 'complexity' - eyes)

8. If evolution occurs in steps, what use is half a wing or eye?

- Evolution is not about “progress.” If a variation is neutral or marginally better it may be passed on.
- Certain characteristics are damaging in some forms (sickle cell, bird plumage)

9. Does the evidence really exist?

- In short, overwhelmingly. Numerous examples of discovery of predicted intermediate forms, genetic similarity studies, and new molecular mapping have only confirmed the theory
- There are no cases where evolution has been found to be false

•9 (Cont.)

- The lines of evidence in favour of evolution are:
 - Fossil evidence
 - Homologies
 - Distribution in time and space
 - Evidence by example



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10. What about God?

- Science has nothing to say about God, not out of rejection, but merely because there is no way of studying or ascertaining theological truth
- For some people, unfortunately, the only way of dealing with their conflict is to deny the evidence for evolution altogether
- many scientists are very devout, and have no conflict with their understanding of evolution and their religion

“There can be no scientific dispute with respect to faith, for science and faith exclude one another. Not that one makes the other impossible or vice-versa, but rather that belief has no place as far as science reaches and may first be permitted to take root where science stops.”

Rudolph Virchow (1958) 'On Man', Disease, Life, and Man: Selected Essays Oxford: Oxford University Press p.83.