

Is Evolution Weak Science, Good Science, Or Great Science?

How Does Evolution Compare With Other Major Scientific Theories?

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1. How Many Independent Lines Of Evidence Support The Theory?

- Relativity, for example, is supported by only a few lines.
- Multiple lines support both evolution and plate tectonics, so they are stronger.
- *The evidence showing that Evolution has occurred is stronger than that which shows that the planets orbit the sun.* If it is a fact that the planets go around the sun, then it is a fact that we evolved from ancestors much simpler than fishes, indeed a stronger fact. If evolution is a theory, then the planets orbiting the sun is a weaker theory. Best put: *Both are very strongly inferred facts.*

2. How Many Previously Unconnected Areas of Knowledge Did (Does) A Theory Unite?

- Bronowski: Newton's greatness lay in connecting two kinds of motion that everyone knew to be independent, that of celestial bodies and that of terrestrial objects.
- Darwin connected evolutionary history with the Linnaean hierarchy, with patterns of distribution, with the patterns of compromises in adaptation, and more.
- *In connecting several fundamentally different natural phenomena, Einstein was the Darwin of physics.*

3. Does The Theory Make Important Predictions?

- All of these theories make precise quantitative predictions for simple systems.
- For complex systems, the most powerful predictions are of non-existence:
- As mammals and birds originated from disparate taxa of reptiles, we can predict that no fossil intermediates between bats (or other mammals) and birds will ever be found.

4. How Clear Are The Causal Mechanisms?

- Physicists: Newton renamed falling tendency and pretended to have explained it. Gravitation is still unexplained (as is wave-particle duality in quantum mechanics)
- Darwin's forces were natural selection and a tendency of organisms to resemble their parents and more remote ancestors for similarly unknown reasons.
- *Now, heredity (DNA) makes deep resemblance to ancestors physically inevitable.*
And: the impossibility of perfect consistency in replication makes evolution inevitable.

5. Does The Theory Adequately Explain Ultimate Origin Of The Systems It Describes?

- Neither relativity nor quantum mechanics adequately explains the ultimate origin of the physical universe. Plate tectonics does not explain the origin of the earth.
- Thus, the fact that evolution does not adequately explain the origin of life does not make it weaker than other major scientific theories.

6. Is The Theory Scientifically Controversial Or Only Publicly Or Politically Controversial?

- Each of these theories has essentially universal scientific acceptance (except where scientists are motivated by non-scientific considerations).

7. Is The Theory Fundamental To Many Practical Benefits Embraced By Our System?

- Each of these theories has important economic benefits. Evolution is of continuing importance in agriculture and of growing importance in medicine and industry.
- Jim Bull: As the 20th century was dominated by applied physics and chemistry, *the 21st Century will be dominated by applied evolution.*

8. Is The Theory Widely Understood And Accepted By The General Public?

- Plate tectonics and evolution require acceptance of an old earth. (Rejected by a plurality.) Quantum mechanics and relativity are inaccessible and very counter-intuitive.
- *NO major scientific theory is widely understood and accepted by the general public.*

Summary: How DOES Evolution Compare With Other Major Scientific Theories?

- On each of these eight criteria, evolution is as good or better than the other theories.
- *EVOLUTION IS AS GOOD AS GREAT SCIENCE GETS!*