2000
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of page

Sorting out the evolution of evolution headlines
Lay out your own timeline of how the theory of evolution developed

Cut off the left hand edge of these four Earthlearningidea sheets and stick them together to form a timeline. Then stick it down on a bench or table.

Cut out the milestone boxes in the evolution of evolutionary theory below into strips. Leave the dates attached for less able pupils, but remove them for the more able.

1975

Then invite the pupils to sort out the headlines and place them in the correct places on the timeline – to show how evolutionary theory evolved.

evolution' timeline

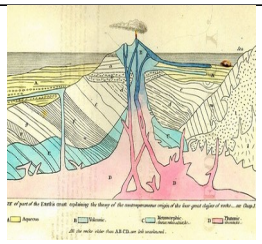
Photo: Chris King

1650	**Species static** The early part of the bible is interpreted to show that species are static and there is no evolution. The date of creation of all species is calculated by Archbishop Ussher as 4004BC. Archbishop Ussher		*This image is in the public domain because its copyright has expired.*

1950

1740 - 1796	**Evolution – but how?** Early evolutionary ideas are presented by natural philosophers, Pierre Maupertuis and Erasmus Darwin. Pierre Maupertuis		*This image is in the public domain because its copyright has expired.*
1798	**The population problem** Thomas Malthus publishes his idea that populations increase geometrically (2,4,16) whilst food production only increases arithmetically (2,3,4) so there must be population crashes. Thomas Malthus		*This image is in the public domain because its copyright has expired.*

1925

1800	**Inherited evolution** Jean-Baptiste Lamarck develops his evolutionary theory – that evolution occurs because offspring change in response to the environment, and these changes are inherited from their parents (later shown to be incorrect). Jean-Baptiste Lamarck		*Permission is granted to copy, distribute and/or modify this document under the terms of the GNU Free Documentation License, Version 1.2*
1830	**An abyss of time** Charles Lyell publishes the first edition of his '*Principles of geology'* publicising James Hutton's ideas that geological time is vast. Diagram from Lyell's *'Principles of Geology'*		*This image is in the public domain because its copyright has expired.*

1900
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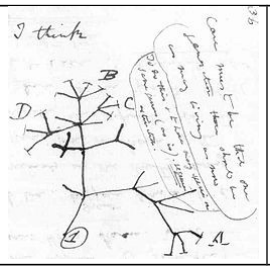
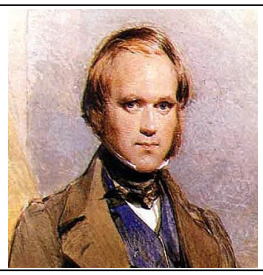
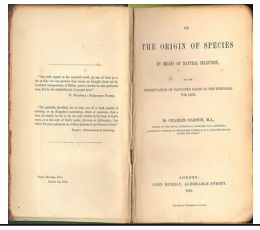
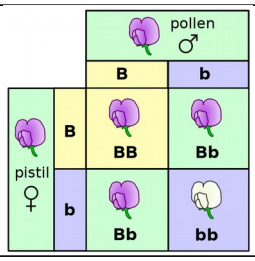
1837	**An evolutionary mechanism – I think** Charles Darwin first sketches his ideas of evolution by natural selection. Darwin's first sketch of evolution		*This image is in the public domain because its copyright has expired.*
1858	**Evolution by changing varieties** Alfred Russell Wallace's theory of evolution is presented as a paper, '*On the Tendency of Varieties to Depart Indefinitely From the Original Type*' on 1st July at the Linnean Society in London. Alfred Russell Wallace		*This image (or other media file) is in the public domain because its copyright has expired.*

1875

1858	**Evolution by natural selection** Charles Darwin's theory of evolution by natural selection is presented in a paper, '*On the Tendency of Species to form Varieties; and on the Perpetuation of Varieties and Species by Natural Means of Selection*' on 1st July at the Linnean Society in London. Charles Darwin		*This work is in the public domain in those countries with a copyright term of life of the author plus 100 years or fewer.*
1859	**The origin of species** Charles Darwin publishes his theory of evolution by natural selection, with much background evidence, in his book, '*On the origin of species*'. A first edition of '*On the origin of species*'		*This image is in the public domain because its copyright has expired.*

1850

1865	**The Laws of Inheritance** Gregor Mendel publishes his work on genetics, based on the cultivation of pea plants, from which he developed his 'Laws of inheritance'. Diagram of Mendel's inheritance work on pea flowers		*I, Madprime, the copyright holder of this work, hereby publish it under the GNU Free Documentation License, Version 1.2*
1900	**From genes to mutation** Hugo de Vries rediscovers Mendel's laws and first uses the terms 'genes' and 'mutation'. Hugo de Vries		*This image (or other media file) is in the public domain because its copyright has expired.*

1825

1925	**Guilty of evolution** In the 'Scopes Monkey Trial', in Tennessee, USA, John Scopes, a school teacher, is found guilty of teaching evolution, but the verdict is overturned. John Scopes		*This file is in the public domain, because there are no known copyright restrictions on this image according to the Smithsonian Institute*

1800
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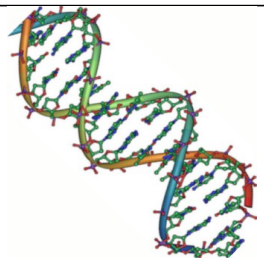
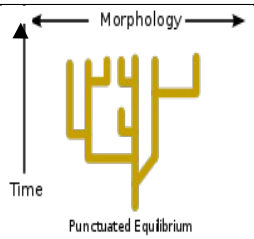
1944	**DNA discovered** Oswald Avery discovers that genes and chromosomes are made of DNA. Oswald Avery		*This work is in the public domain because it is a work of the United States Federal Government under the terms of Title 17, Chapter 1, Section 105 of the US Code.*

1953	**A helix!** James Watson and Francis Crick discover that the molecular structure of DNA is a helix. Diagram of the molecular structure of DNA		*I, Jerome Walker, Dennis Myts, the copyright holder of this work, release this work into the public domain. This applies worldwide.*

1775

1972	**Evolution by punctuated equilibrium** Niles Eldredge and Stephen Jay Gould publish their work on punctuated equilibrium, suggesting that evolution happens in bursts, with only slow evolution in between. This is different from previous ideas of steady gradual evolution. Diagram showing punctuated equilibrium		*I, Miguel Chavez, the copyright holder of this work, release this work into the public domain. This applies worldwide*

2000	**Human genome drafted** Craig Venter announces that a draft of the human genome has been mapped for the first time – but more detailed mapping must continue. The first printout of the human genome, presented as a series of books. The 3.4 billion units of DNA code are presented in more than a hundred volumes, each a thousand pages long, in type so small as to be barely legible.		*This file is licensed under the Creative Commons Attribution-Share Alike 3.0 Unported license by Russ London.*

1750

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The back up

Title: Sorting out the evolution of evolution headlines

Subtitle: Lay out your own timeline of how the theory of evolution developed

Topic: A timeline/card sort exercise, asking pupils to put cards of 'milestones' in the evolution of evolutionary thought into the most appropriate places on a timeline.

Age range of pupils: 14 years+

1725

Time needed to complete activity: 15 mins

Pupil learning outcomes: Pupils can:

- describe how evolutionary thought developed over time;
- explain how the idea of evolution was developed through the work of many scientists.

Context:
The correct order of cards is opposite.

1650	**Species static** Archbishop Ussher
1740 -1796	**Evolution – but how?** Pierre Maupertuis and Erasmus Darwin.
1798	**The population problem** Thomas Malthus
1800	**Inherited evolution** Jean-Baptiste Lamarck
1830	**An abyss of time** Charles Lyell
1837	**An evolutionary mechanism – I think** Charles Darwin – sketch of evolution
1858	**Evolution by changing varieties** Alfred Russell Wallace
1858	**Evolution by natural selection** Charles Darwin – paper
1859	**The origin of species** Charles Darwin - '*On the origin of species*'.
1865	**The Laws of Inheritance** Gregor Mendel
1900	**From genes to mutation** Hugo de Vries
1925	**Guilty of evolution** The 'Scopes Monkey Trial'
1944	**DNA discovered** Oswald Avery
1953	**A helix!** James Watson and Francis Crick
1972	**Evolution by punctuated equilibrium** Niles Eldredge and Stephen Jay Gould
2000	**Human genome drafted** Craig Venter

Following up the activity:
Pupils could be asked to carry out further research into these important scientists.

Underlying principles:

- Evolutionary theory was not a sudden development, but evolved as scientific thinking evolved.

Thinking skill development:
Through this activity, pupils are asked to construct a likely pattern of the development of the theory, by sorting the cards into the correct order. Cards that don't seem to fit the pattern cause cognitive conflict. When sorted, their thinking can be challenged, resulting in metacognition.

1675

Resource list:

- the timeline, cut from the edge of these sheets and stuck together
- the cards above, cut out
- scissors to cut out the items above
- tape to stick the timeline together
- Blu Tac™ to stick the timeline down

Source: Devised by Chris King of the Earthlearningidea Team.

1650