Archaeopteryx.mp4 Transcript:

I have here a cast of an extremely famous fossil, the fossil of *Archaeopteryx*, one of the earliest known birds. *Archaeopteryx* has a lot in common with modern birds. It has a light skeleton; it has long arm bones in its wings, and of course, it has feathers for flying. And, scans of its skull reveal that the areas of the brain associated with vision and balance were enlarged - very useful if you are an animal that flies. But, there are also odd things about this skeleton of *Archaeopteryx*, things which link it back to its dinosaur ancestors. *Archaeopteryx*, unlike modern birds, has little sharp teeth; it has three clawed fingers within its wing, and it has a long, bony tail. So, as an extremely early bird, *Archaeopteryx* shows more traces of its dinosaur ancestors than our modern birds today.

DNA.mp4 Transcript:

Do you like Brussels sprouts? Some people do, and some people don’t. Can you roll your tongue? Again, some people can, and some people can’t. Even though we’re all members of the same species, *Homo sapiens*, we’re all different to each other. Even offspring of the same parents are genetically different, and genetic variation is fundamental to life and the way that life evolves. Our genetic code is carried by this molecule. This is DNA, or deoxyribonucleic acid, and variation is introduced into this molecule in a number of different ways. In sexually reproducing animals, like us, we create variety by making sex cells, eggs and sperm, with unique combinations of genes from each parent. But there can also be mutations: this means changes to the unit, the nucleotides, that make up the DNA. This can happen because of copying errors or because of damage to the DNA. Mutations sound like bad news, but in fact they’re crucial to creating variety, and without them, evolution would virtually grind to a halt. And it’s evolution that has created the diversity of life on the planet, and allowed life to evolve and adapt to changing environments.

Evolution of horse.mp4 Transcript:

Fossil evidence clearly shows us that life on the planet hasn’t always looked the way it does today. Take horses, for example. The ancestors of our modern horses looked completely different, and we know that because we have a fantastic fossil record stretching back around 60 million years. The ancestors of horses were small creatures with several toes and they lived in rainforests. Their small size would have meant that they could hide in the undergrowth, and their splayed toes meant that they could walk on marshy ground. But then the environment changed; the forest started to disappear and grasslands spread out, and horses adapted to this changing environment. They became larger, taller, longer-legged, and fleet of foot. They were able to range widely across the grasslands, eating enough grass, but also, being able to run away fast from predators. And just think about horses’ legs today. They don’t have this many toes. In fact, they’ve reduced down to a single toe on each leg. A single toe, and a single hoof.

Investigate Introduction.mp4 Transcript:

Hello, I’m Alice Roberts and this is the Sensing Evolution trail at the Oxford University Museum of Natural History. This is your chance to discover as much as you can about evolution, which is a fundamental idea in biology. It explains the diversity of life on the planet, and how we came to be here in the first place. The trail accompanies the Sensing Evolution touchable tables in the museum, and it’s your chance to explore the evolutionary adaptations of a wide range of mammals, reptiles, and birds. Have fun exploring!

Natural selection.mp4 Transcript

A Snowy Owl has incredible hearing and eyesight, near silent flight, feathered talons, and of course, it’s white. These are all incredibly valuable features for an Arctic predator, and they’re the result of natural selection acting on countless generations of Snowy Owls. Parents with characteristics which help them survive and reproduce would be most likely to pass on those characteristics to their offspring. And we think that natural selection is even acting on the size of the snowy owl as well, because average-sized owls tend to have the most offspring. This might all be about energy. Larger owls might have too much of an energy demand to have plenty of offspring. Smaller owls might not get enough larger prey, and so, natural selection favours an optimum body weight where more offspring will be produced. Natural selection acts on every single species on the planet and we see a wonderful range of animals adapted to all sorts of different environments. And of course, natural selection and evolution is still happening.

Our place in evolution.mp4 Transcript

In his 1871 book, *The Descent of Man*, Charles Darwin suggested that humans were descended from ancestral African apes. Now since then, many fossils of ancestral, human-like species have been discovered. We have about 20 of these species now, and all of these “hominins”, as we call them, are more closely related to us humans than they are to African apes like chimpanzees and gorillas. One of the most famous hominin species is *Australopithecus afarensis*, and one of the most famous fossils of that species is called “Lucy” and she was discovered in 1974 in Ethiopia. And in fact, there was much more of Lucy’s skeleton than I’ve got represented here. We have about 40% of her skeleton, and that’s enough to see that there are important differences between her skeleton and that of living African apes like chimpanzees and gorillas. And those differences relate to the way in which she moved around. We know from looking at her skeleton that Lucy was adapted to walking upright on two legs.

Reproductive success.mp4 Transcript

Reproduction is key to the survival of any species. Even amongst mammals, we find differences in reproductive strategies. Some species like us humans tend to have just a few offspring, and we look after them very carefully, and this improves their chances of surviving to adulthood. Other species have a very different strategy, and they have many, many offspring. A really good example of that is the shrew. A female shrew has between 15 and 28 offspring in every breeding season. In every single litter, there is going to be variation: those offspring are going to differ from each other. Some individuals are going to be better suited to the environment that they’re born into, and they’ll have a better chance of survival. So this is what’s known as “survival of the fittest”. But natural selection doesn’t stop there, because even amongst the shrews that survive to adulthood, there will be varying numbers of offspring. So natural selection is actually about survival and reproduction.

Sexual selection.mp4 Transcript

As we’ve seen with the Snowy Owl, all living things compete for the resources they need to survive and reproduce. But there is much more to reproduction than just having enough energy to produce offspring. You need to attract a mate. One way of doing that is to show off. A very good example of that is the peacock’s tail. Peahens prefer peacocks with flamboyant tails with plenty of eye spots, and so over time, the peacock’s tail has become more and more extravagant. This is what’s known as sexual selection. In comparison with the peacock, the peahen is drab, and that’s an advantage to her when she is sitting on her nest keeping her eggs warm. And so, over countless generations, the effects of sexual selection and natural selection have exaggerated the difference between males and females, between peacocks and peahens.

What was special about Darwin.mp4 Transcript

Charles Darwin is probably the most famous biologist of all time. This museum opened in 1860, just a year after Darwin published the book that would make him famous, *On the Origin of Species*. In it, he described how a completely natural process, a process he called “natural selection”, could shape life on the planet, and through gradual change produce millions of different species. Darwin wasn’t the only biologist thinking and writing about evolution in the 19th century, but he described how evolution could happen, and that was a real breakthrough. He also wrote for a general audience. *On the Origin of Species* wasn’t a book written to be read by scientists. It was a popular science book, and it was so widely read that Darwin quickly became world famous.