

Audioscripts

- EMMA: About seeds that lie in the ground for ages and only germinate after a fire? Q25
 JACK: That's the one. I knew a bit about it already, but not about this research. His analysis of figures comparing the times of the fires and the proportion of seeds that germinated was done in a lot of detail – very impressive.
 EMMA: Was that the article with the illustrations of early stages of plant development? They were very clear.
 JACK: I think those diagrams were in another article.
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- EMMA: Anyway, shall we have a look at the procedure for our experiment? We'll need to get going with it quite soon.
 JACK: Right. So the first thing we have to do is find our seeds. I think vegetable seeds would be best. And obviously they mustn't all be the same size. So, how many sorts do we need? About four different ones? Q26
 EMMA: I think that would be enough. There'll be quite a large number of seeds for each one.
 JACK: Then, for each seed we need to find out how much it weighs, and also measure its dimensions, and we need to keep a careful record of all that. Q27
 EMMA: That'll be quite time-consuming. And we also need to decide how deep we're going to plant the seeds – right on the surface, a few millimetres down, or several centimetres. Q28
 JACK: OK. So then we get planting. Do you think we can plant several seeds together in the same plant pot? Q29
 EMMA: No, I think we need a different one for each seed.
 JACK: Right. And we'll need to label them – we can use different coloured labels. Then we wait for the seeds to germinate – I reckon that'll be about three weeks, depending on what the weather's like. Then we see if our plants have come up, and write down how tall they've grown. Q30
 EMMA: Then all we have to do is look at our numbers, and see if there's any relation between them.
 JACK: That's right. So ...

SECTION 4

Hi. Today we're going to be looking at animals in urban environments and I'm going to be telling you about some research on how they're affected by these environments.

Now, in evolutionary terms, urban environments represent huge upheavals, the sorts of massive changes that usually happen over millions of years. And we used to think that only a few species could adapt to this new environment. One species which is well known as being highly adaptable is the crow, and there've been various studies about how they manage to learn new skills. Q31
 Another successful species is the pigeon, because they're able to perch on ledges on the walls of city buildings, just like they once perched on cliffs by the sea. Q32

But in fact, we're now finding that these early immigrants were just the start of a more general movement of animals into cities, and of adaptation by these animals to city life. And one thing that researchers are finding especially interesting is the speed with which they're doing this – we're not talking about gradual evolution here – these animals are changing fast. Q33

Let me tell you about some of the studies that have been carried out in this area. So, in the University of Minnesota, a biologist called Emilie Snell-Rood and her colleagues looked at specimens of urbanised small mammals such as mice and gophers that had been collected in Minnesota, and that are now kept in museums there. And she looked at specimens that

Test 1

had been collected over the last hundred years, which is a very short time in evolutionary terms. And she found that during that time, these small mammals had experienced a jump in brain size when compared to rural mammals. Now, we can't be sure this means they're more intelligent, but since the sizes of other parts of the body didn't change, it does suggest that something cognitive was going on. And Snell-Rood thinks that this change might reflect the cognitive demands of adjusting to city life – having to look in different places to find food, for example, and coping with a whole new set of dangers.

Q34

Q35

Then over in Germany at the Max Planck Institute, there's another biologist called Catarina Miranda who's done some experiments with blackbirds living in urban and rural areas. And she's been looking not at their anatomy but at their behaviour. So as you might expect, she's found that the urban blackbirds tend to be quite bold – they're prepared to face up to a lot of threats that would frighten away their country counterparts. But there's one type of situation that does seem to frighten the urban blackbirds, and that's anything new – anything they haven't experienced before. And if you think about it, that's quite sensible for a bird living in the city.

Q36

Q37

Jonathan Atwell, in Indiana University, is looking at how a range of animals respond to urban environments. He's found that when they're under stress, their endocrine systems react by reducing the amount of hormones such as corticosterone into their blood. It's a sensible-seeming adaptation. A rat that gets scared every time a subway train rolls past won't be very successful.

Q38

There's just one more study I'd like to mention which is by Sarah Partan and her team, and they've been looking at how squirrels communicate in an urban environment, and they've found that a routine part of their communication is carried out by waving their tails. You do also see this in the country, but it's much more prevalent in cities, possibly because it's effective in a noisy environment.

Q39

So what are the long-term implications of this? One possibility is that we may see completely new species developing in cities. But on the other hand, it's possible that not all of these adaptations will be permanent. Once the animal's got accustomed to its new environment, it may no longer need the features it's developed.

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So, now we've had a look ...