

# Inside the Animal Mind

1. Part 1. Watch the first few minutes of the video and complete the following information:

Where?

What?

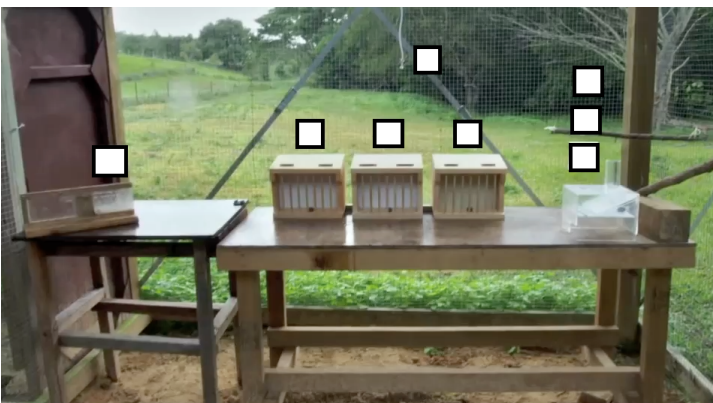
Why?

Can you explain what is happening here?



2. Watch on. What does the experiment involve? What is the crow's task? Link the following terms. Afterwards, check with a partner to see what you have understood.

crow	morsel of food	container
aviary	puzzle	tools
problem	short stick	piece of string
three stones	cages	short stick
long stick		plastic box

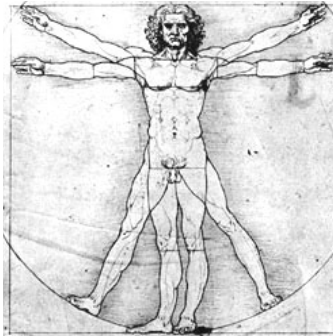
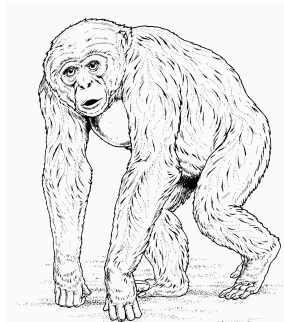


3. Look at the screen capture and try and solve the crow's problem together.
4. Check by watching...
5. Now listen. Take notes so you can describe each stage of the problem.

6. Listen again for detail. True or false?

- a. The bird in the video is also known as 'James Bond'.
- b. The bird has never seen the objects in the experiment before.
- c. The bird completes all the stages of the puzzle without hesitation.

7. Part 2. Look at the animals below. What do they all have in common? How are they different?



1. Watch the next part of the video and note down the key ideas given by the presenter. What question does he want to answer?

2. What skills / characteristics do the animals below have? Talk about it with a partner. Then watch the video to check. Take notes of the examples / definitions to justify / develop your answers.

	Apes	Humans	Corvids
Make simple tools			
Make multi-staged tools			
Follow traditions / culture			
Pass ideas across populations			
Pass ideas from one generation to the next			
Build on previous generations' ideas			

3. Recap – what tools do the crows use? How do they use them? Scan the transcript for vocabulary associated with tools and problem-solving: *After this exo introduce try it out and elicit inject vocab if necessary to add to the table.*

(verbs) actions	(nouns) tools

# TRANSCRIPT

## Part 1

Welcome to a lost world: the island of New Caledonia. Lying nearly 1000 miles east of Australia, it's tropical paradise, bursting with exotic life found nowhere else on the planet. I'm here to find one of these unique animals. It has an almost legendary status, thanks to an amazing ability to solve problems. The animal that I'm looking for is truly remarkable. The problem is that it's very very difficult to find. It's cunning, it's quick, agile and if I'm honest with you, there could be one right here somewhere, just looking down at me and I've never ever seen one.

Many experts think that these are the cleverest animals on earth. I've been told I might see their intelligence in action on the island's high mountain roads. It's this, a crow, but not just any crow. This is the New Caledonian crow. It's not the same species that we find in Britain. These are jungle birds, and here in isolation on the island, they've evolved some remarkable abilities. This one is holding a nut in its claw. It drops it on to the tarmac, seemingly to crack open the hard shell. But in truth, it's what the bird does next that's really ingenious.

Now look at this, this is interesting, because having broken the nut open on the road, these birds are then carrying it to the Armco here, where there are small depressions, manmade cuts in it and they are using these as a vice, to stop the nut from rolling around whilst they access the fruit on the inside of it. Now, that, strikes me as pretty clever. But the question is of course just how clever are these birds?

To find out, I've come to visit doctor Alex Taylor, at his field aviary here on the island. To study how these birds solve problems, he's put a tasty morsel of food deep in a container. He's testing whether they can work out how to reach it using a variety of objects he's placed in the aviary. But first, he's trying his puzzle out on me!

Imagine you're a crow, here's your food, in a deep hole, how would you go about with the tools available to you on this table solving this problem?

This is part of it, obviously.

Ahem.

At my disposal, I've a short stick on a piece of string, three stones inside the cages, and a longer stick trapped in a box.

...which means then that the crow is going to use this stick to get the stones out of there.

Absolutely.

Next, the crow needs to drop the stones on to a trap door to release the long stick.

It's going to need all three stones then it probably will drop that one out. And using this long stick, it'll finally be able to reach the food.

This is a tough one, can I stay in here?

Absolutely, you can stay and we'll see what happens.

Right, come on, send in your mastermind, 'cause it's going to need that.

Alex studies wild birds, which he releases after three months of research. This one is nicknamed 007 and it's about to attempt what Alex believes is one of the most complex tests of the animal mind ever constructed. The bird is familiar with the individual objects, but this is the first time he's seen them arranged like this: 8 separate stages that must be completed in a specific order if the puzzle is to be solved, and if the bird succeeds, it'll be a world first. He takes times to have a look and then starts with the short stick. Stage 1. He finds it's too short to reach the food, he then sets off to get the first stone. But he drops it... and another. He seems to be stuck. But then, something seems to click. He deploys the first stone. And then another. Got it! The 8<sup>th</sup> and final stage. Success! 8 individual stages of one complex puzzle completed. That was remarkable. I've never ever seen anything like it. Of all of the bird behaviour that I've seen, nothing matches that. I can hardly believe it, I'm still just running that sequence through my mind, it happened really quickly, but the immediate question is of course how on earth did that crow do that?

(...)

## Part 2

All these animals eat a wide variety of food and need to master different techniques in order to obtain them. They crack, they pluck, and they hunt. Our own omnivorous diet isn't too different. And all these animals tend to be both predator and prey, which is also true of our own ancient ancestors on the plains of Africa millions of years ago. So it seems that to live flexibly, you have to be able to think flexibly. But there's something else that the supreme problem-solvers, the apes, the corvids and the parrots share – they live in groups. So, whether they walk, swim or fly,

the supreme problem solvers of the animal kingdom are not quite so different from one another as we might at first imagine. Though their minds are not as potent as ours, their powers to reason and even exercise imagination are quite remarkable. But then up until now, we've been looking at them on their own, as individuals, what I want to understand next is do they have the capacity like we humans to actually share solutions to problems. In short, if they have a good idea, can then pass it on? On New Caledonia, the crows have lots of good ideas. They are precision toolmakers. This one is in the process of doing something we'd normally expect only of humans. It's crafting a hook that it's going to use to catch its prey. It's an astounding behaviour.

Dr Alex Taylor and his colleagues are now investigating whether these birds are able to share their tool-making skills with each other.

That is amazing! They've sculpted a little hook out of another piece of the twig that formerly would have run out here. It's beautiful, it's almost like a primitive human tool isn't it?

It does appear that way, we talk about the imposition of a three-dimensional form on to a natural object, that something that really humans have only been able to do for the last 100 / 200,000 years and here we have a crow doing something very similar.

And you can see how that would be useful – as the crow would be able to insert that into a hole and literally use that hook to draw out that grub that it was after. Made by a bird, that is absolutely brilliant.

And of even more interest to Alex are these. Intricately plucked tools from the leaves of the pandanus tree. Unlike the hooks, there are distinctly different types of pandanus tool. They differ in complexity, ranging from a simple leaf fragment to multi-stepped implements like these, and across the island, different groups of crows use different types of these tools. In the south, many different fragments are found. But as we move north, the crows start to favour more complex multi-staged tools. It means the different groups of crows have their own ways of doing things. In human society, we call this culture.

What we're seeing across New Caledonia, is populations of crows that appear to have traditions of making single-step or two-step or three-step tools... these traditions are persisting over 10 or 15 years at least, which is how long we've been studying them for and we think they've been there for a lot longer. So it appears there is some kind of transmission of the tool science across the population.

A rare and fascinating glimpse of how this might happen has been captured on camera. Here, an adult bird is using a stick to probe grubs hidden inside a log. A youngster stands by watching as the adult seems to demonstrate the right way to use the tool, and when the adult departs, she leaves behind the stick in the hole. The youngster can now have a go itself, although this one has some way to go before it becomes an expert like its parents. It seems as though one way that our ideas can travel through the crow population is via family groups – the social circle. But Alex's research suggests something even more extraordinary, that with each new generation, the ideas don't stand still, but are honed and improved.

When we talk about this, we talk about something called the ratchet effect, which is the idea that it's a really good idea to be able to copy each other and as a group you can end up being able to build better and better tools – obviously we don't invent the wheel every generation ourselves, we make it better and better. Potentially, this is what's going on here with the crows. There is no concrete evidence that any other animal species able to show this ratcheting up of their technology to make it more and more sophisticated.

So it would just be crows and humans – no chimpanzees, nothing?

At the moment it would appear so, we something that we think is unique to humans but maybe it's going on in these crows as well.

## Verbs and prepositions – biology

There are 2 types of verb + preposition.

1. Dependent prepositions = made **of** protein = verb +of + noun
2. Verb + adverbial preposition = he **made up** a story = verb + noun

The meaning can be physical or metaphoric... easy to guess or more difficult..

Examples: He walked out of the room. / She walked out on him.

Who ended the relationship?

He looked up at the moon. / She looked up “moon” in the dictionary.

She felt put out when he didn't call/ Turn out the lights when you leave.

Choose the **best** preposition or **combination** of prepositions.

1. Lipids are composed with /of /by triglycerol.
2. They are absorbed by /to/ with the intestine.
3. Paralysis is often associated to/ by /with polio.
4. The gamma subunit carries out/through/on an important enzymatic activity.
5. A molecule known as GDP links up/at/to/with /by the gamma subunit.
6. Enzymatic activity converts GTP back/ into/for/ by /to/with GDP.
7. The second phase of photosynthesis consists in/of/to/ reducing Co<sub>2</sub> down/in/ at/into sugar.
8. DNA consists in/of/by/to two helical strands.
9. In the third stage the fatty acids move up/through/out of the micelles and enter to/in/into the intestinal cells.
10. *Fasciola hepatica* goes in/at/ into/inside an ant to hatch its eggs then returns to/in/at the sheep's liver.
11. The waste will be thrown back/away/out by exocytosis.
12. Ants are made up/with/out/ of two stomachs.
13. The clone will differentiate into/in/for two different cells.
14. DNA is composed of/by/with/for a random succession of bricks called nucleotides.
15. The ribosomes translate the RNA in/into/to proteins.
16. There is an immune response when we are infected by/for/to a new pathogen.