



Tool Usage

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Exclusively Human?

For many years it was believed that tool usage was an exclusively human domain and one of the things that separated humanity from other animals.

Then it was shown that otters and some primates used tools. Still, the theory was held that it was a higher level skill. It is now known that everything from ants to birds to octopi also use tools. Some animals even manufacture their own tools.

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Hunting and Food Gathering Behaviors

Most animals that use tools use them for gathering or catching food. Tool usage has been recorded in most animal groups.

Ants make use of leaflets to transport food. Many species of spider make use of tools from bolas made of spider silk that are used to catch and reel in insects to trap doors made of dirt and held up by spider silk until the unsuspecting animal gets ambushed.

Many animals including birds and mammals will use rocks and heavy objects to break things like shells open.

Some octopi carry shells around to hide in so they can avoid predation. Dolphins will pick up marine sponges and use them to stir up the sediment so they can find prey, protecting their sensitive rostra by using the sponge instead of the rostra to scrape the sediment.

Many bird species make use of twigs to gather grubs and bugs from holes in trees. The New Caledonia crow [1] takes it a step further and makes its own tools. The bird will actually trim the stick of branches to ensure it fits into the hole or cut a tool out of the leaf of the pandanus plant to create something they can spear grubs with.

Chimpanzees [2] also manufacture their own tools. They will take branches, removing twigs and making it into a spear shape. They also sharpen the end of the spear using their teeth. They then use this to hunt bushbabies.

Orangutans make whistle-like objects out of rolled leaves that they use to ward off predators.

Tool Usage For Other Purposes

Food is a necessary resource and anything that makes getting food easier or more profitable can be seen as an adaptation worth having. Some animals have developed tools for other uses though.

Gorillas will use sticks to test the depth of waterways and logs to create bridges over water.

Elephants have been seen using branches to swat flies. They sometimes modify the branches so they are the correct length for this purpose. Elephants have also been known intentionally drop logs and rocks onto electric fences to short them out so they can pass over them. They have also been reported dropping balls of chewed up bark around water holes to prevent other animals accessing the water.

Using tools to reduce competition for resources is another common occurrence. Some ant species will use pebbles to lock rival colonies in their burrows by blocking off the exit.

Learning and Intelligence

Tool usage was once seen as an indicator of higher intelligence. Certainly the modification of tools to suit a purpose is still seen in that light to a certain degree but the basic use of an instrument to achieve a goal is no longer believed to be a sign of intelligence.

Many of the tool use behaviors are believed to be genetically wired into the animal through evolution. Learning to use a tool to solve a problem in an artificial situation may be a better indicator of intelligence. Having said, there are many examples of animals learning to do just that in zoos, aquariums and laboratories. While most studies center on primates and crows, there have been studies that have demonstrated the ability of degus [3], a rodent that is similar to a chinchilla, to learn to use a rake to bring food to themselves. How much is a result of problem solving and how much is just mimicry of what they observe another individual doing is harder to separate.

Robert Sapolsky

Robert Sapolsky, a Stanford professor in biology and neuroscience, explains the main differences between humans and animals and what is unique about humans when using tools:

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Links

[1] http://news.nationalgeographic.com/news/2003/04/0423_030423_crowtools_2.html

[2] <http://www.livescience.com/4395-chimps-spears-hunt-bushbabies.html>

[3] <http://www.livescience.com/2408-small-rodents-taught-tools.html>