

THE SHAPE OF ENRICHMENT

A Quarterly Source of Ideas for Environmental and Behavioral Enrichment

Providing Enrichment at No Cost

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The Phoenix Zoo is a private, non-tax-supported organization, which means we have to be very careful of how the budget is spent. The keepers feel responsible for helping the zoo in every way, including determining ways to decrease expenses, especially on projects that do not have the highest priorities. The animal keepers have spent countless hours reading about our animals and observing how

they spend their time, in order to come up with some simple behavioral enrichment ideas that cost the zoo absolutely nothing. We have compiled a behavioral enrichment book to organize these



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Fennec fox
(*Fennecus zerda*)

and other ideas, to be sure they are not repeated too often or ignored. Many of these ideas, besides being cost effective, often require no construction or repair. They are easy to maintain and modify, and they can be installed on exhibit or in nighthouses in less than five minutes. When a food item is used, its nutritional value has already been calculated as part of that particular animal's diet, based upon its scheduled use. The following are examples of the no-cost behavioral enrichment techniques used at the Phoenix Zoo.

Mounds

It is well known that cats like to climb to the top of hills and mounds to search for prey or survey their surroundings. We simply rake gravel into

mounds, and cats like our cheetahs (*Acinonyx jubatus*) show special interest in them. They mark the mounds with urine or feces, and they sleep next to or on top of the mounds. When we add new gravel or rocks to the mounds, or even break them down, the cheetahs demonstrate similar behaviors. The key is to change the mounds regularly, so that they look different and stimulate interest. This idea has worked with many other species as well. Wattled cranes (*Bugeranus carunculatus*) display to a mound, sharpen their beaks on it, and search for food in it. Our southern white rhinoceroses (*Ceratherium simum simum*) sleep on a new mound, digging holes in it to support their legs while they sleep. Meerkats (*Suricate suricatta*), fennec foxes (*Fennecus zerda*) and Chacoan peccaries (*Catagonus wagneri*) investigate new mounds for scents. Sometimes they roll on the mounds, make tunnels in them, or make a bed out of a new mound.

Urine, Feces, and Substrate

If the samples are free of parasites and disease, providing urine and fecal samples from one species to another is a simple, no-cost idea. Fecals especially have a remarkable effect on cats. We have used same-species fecals—providing female fecals to males and male fecals to other males—as well as different species' fecals, both male and female, to stimulate interest in other animals. When given rhinoceros fecals in their exhibit, the African lions (*Panthera leo*) roll in it and use it to change their own scent, which is a natural behavior. They toss it and sometimes taste it. If any type of urine is poured on a log in the African lion or Sumatran tiger (*Panthera tigris sumatrae*) exhibits, they usually rip the log to shreds.



In addition, you can move substrate from one exhibit to another. We have taken substrate from a pronghorn antelope (*Antilocapra americana*) enclosure to a mountain lion (*Felis concolor*) or

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bob cat (*Felis rufus*) enclosure, and from capybaras (*Hydrochoerus hydrochaeris*) to jaguars (*Panthera onca*). Also, we took sand from the sand cat (*Felis margarita*) exhibit and

introduced it into the fennec fox exhibit. The foxes sniffed, dug in, and urinated on the sand.

Seashells

Seashells too large to swallow were offered to small birds and small mammals. Roadrunners (*Geococcyx californiana*) liked to hit the shells on the ground and carry them around in their beaks. Our superb starling (*Supreo superbus*) and red-and-yellow barbets (*Trachyphonus erythrocephalus*) threw them out of the dish one by one. The meerkats scratched them, smelled them, and covered them with dirt.

Dead Trees and Logs

Broken or fallen trees and logs are often easy to find on the zoo grounds. Logs that are given to animals from outside their own exhibit, or from another animal's exhibit,

smell different and are interesting to the animals. We have given short, dead trees with large branches to several animals that like to play on or around them, such as African cape clawless otters (*Aonyx capensis*), hamadryas baboons (*Papio hamadryas*), and mandrills (*Mandrillus sphinx*). A segment cut from a palm tree trunk with different-sized holes drilled into it is often given to our

hamadryas baboons and mandrills. We spread food and seeds in the holes, and it takes the animals several hours to eat all the food. This also works well with meerkats, fennec foxes, and many other animals. Any food item that would be a normal part of their diet—such as honey, mealworms, crickets, and seeds—can be used in this way.

Bamboo poles with holes drilled into them are also used, usually stuffed with both crickets and mealworms. We found that if only one type of insect was stuffed into the poles, it was too comfortable inside and the insects would not come out. However, with both crickets and mealworms inserted, they are anxious to leave the tube and are soon found and eaten. We use the bamboo poles with our ringtails (*Bassariscus astutus*), meerkats, superb starling, and red-and-yellow barbets.

Browse and Fruit

After trimming our trees, the Horticulture Department gives us edible browse to disperse to our animals. A browse list has been approved by our staff veterinarian. This browse is nutritious, full of moisture, can be alternated with lettuce, spinach, or kale, and can be used for many of the following reasons.

(1) Browse can be used for supplemental feed for animals such as reticulated giraffes (*Giraffa camelopardalis*), primates, and tapirs (*Tapirus terrestris*).

(2) Most small birds chew on it.

(3) Spot-billed toucanets (*Selenidera maculirostris*), green aracaris (*Pteroglossus viridis*), and roadrunners like to hide in browse.

(4) Many species, such as wattled cranes, large cats, and primates, will play with their browse. Our tree-dwelling birds like to play tug-of-war with browse. We rip palm fronds into strips and tie each strip around perches and branches, securing each strip with a knot. The birds can then play with it by pulling and tearing at the strips. Also, rafts made of palm logs three feet by two feet were given to our cape clawless otters to float on, climb on, and push around in the water.

(5) Browse provides extra moisture for desert animals such as Nubian ibex (*Capra nubiana*) and desert bighorn (*Ovis mexicana*), especially when they are pregnant. Browse increases diet variety, increases animal activity, and saves money.

On our zoo grounds we have ornamental



Sand cat
(*Felis margarita*)

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orange trees. While their oranges taste rather sour to humans, they are edible. Some of our primates enjoy eating these sour oranges, like our baboons, mandrills, and Bornean orangutans (*Pongo pygmaeus pygmaeus*). Our pileated gibbons

(*Hylobates pileatus*), however, do not like them. While some animals will not eat them, they are very fragrant and many, such as meerkats, lions, tigers, and African gray parrots (*Psittacus erithacus erithacus*), will investigate and play with them.

We are also in the process of harvesting dates and fan palm (*Washingtonia sp*) fruit, which we also grow on the zoo grounds. Additionally, pyracantha (*Pyracantha sp*) berries grow on our zoo grounds and are given to our fruit-eating birds, such as black-naped fruit doves (*Ptilinopus melanospila*) and gray peacock pheasants (*Polyplectron bicalcaratum*). These browse items elicit natural behaviors and they are another alternative to the everyday fruits and vegetables the animals receive. However, whenever supplemental food is added to an animal's diet, it is

important to remember to reduce the original diet accordingly to prevent the animals from gaining weight.

Feathers

After we have ascertained that they are disease- and parasite-free,

we give feathers to our cats, birds, primates, and others. Wattled cranes will display to feathers, dancing around them and tossing them into the air two or three times. Felids also toss feathers, then chase and pounce on them. We found that meerkats and Ruppell's griffon vultures (*Gyps rueppellii*) will play with feathers, too. When

using them for birds, the feathers do not need to be from other birds. Birds are happy to play with their own feathers when they are presented in a different way, such as sticking out of a mound of gravel or a traffic cone.

Flowers

Flowers from our rose (*Rosa sp*) garden are given to our hamadryas baboons and mandrills for eating and to our cats for smelling. Eucalyptus (*Eucalyptus sp*) flowers are given to our red lorries (*Eos bornea*). Additionally, we have given sweet acacia (*Acacia farnesiana*) flowers to our birds, but they often ignore them. Flowers are also useful as toys to most felids and small mammals.

Pinecones

Green pinecones containing seeds are a necessary part of the diet for our thick-billed parrots (*Rhynchopsitta pachyrhyncha*), but it should be noted that green pinecones can cause severe diarrhea in other species, particularly primates. Keepers should work only with old, opened-up pinecones. Animals, such as African gray parrots, meerkats, fennec foxes, hamadryas baboons, and mandrills will play with them, and they can be stuffed with food supplements such as peanut butter or honey, or just used as toys.

Bones

We give small pieces of cut-up beef bones to our ravens (*Corvus corax*), vultures, kit foxes (*Vulpes macrotis*), sand cats, and black-footed ferrets (*Mustela nigripes*). If the animals have a sandy substrate in their exhibits, we hang the bones by ropes or chains so the sand does not cover the bones and is not accidentally ingested. Also, because the marrow inside the bones is very high in calories, we reduce the original diet proportionately whenever we use bones as enrichment.

Paper, Feedbags, and Carboard Boxes

We use paper from our office buildings, both shredded and unshredded, empty feedbags (plastic removed), newspapers, telephone books, and cardboard boxes of all sizes for bedding in our nighthouses. Animals love to dig through it, climb in it to find food, or just play with it! They build nests and mimic natural foraging behaviors, and the primates love to shred telephone books. It is also a contributing part of our zoo's recycling/reuse process!

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Desert bighorn sheep (*Ovis mexicana*)

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Thick-billed parrot (*Rhynchopsitta pachyrhyncha*)



Catnip

Catnip is grown by our Horticulture Department and is given to our cheetahs, lions, ocelots, and sand cat. Only our sand cat seems to show no interest in the catnip. The others sniff, rub, and

roll in it.

Ice Cubes and Blood Popsicles

Summers in Phoenix can be very hot, long, and intense. Many animals appreciate the opportunity to play with and suck on ice cubes in an assortment of varying

sizes. We use either Gatorade, seeds, or fruit pieces to add flavor to the ice. Also, we make blood popsicles with blood residue (left over from food preparation). Our large cats love these. Fish popsicles are made for our cape clawless otter.

Snake Skins

Our Herpetology Department provides us with snake skins that have been shed in their collections. Many species like to investigate, smell, and play with them, such as meerkats, Grevy's zebra (*Equus grevyi*), tigers, bobcats, coatis (*Nasua narica yucatanica*), coyotes (*Canis latrans*), roadrunners, and mountain lions. Our meerkats attacked the snake skins. The zebras were afraid and would not approach them.

Empty Plastic Barrels

We use empty plastic barrels leftover from storing nonhazardous cleaning liquids to provide enrichment for our primates. The barrels are cleaned thoroughly and put into the

baboons' or the mandrills' nighthouses. They hide in, play with, or jump on the barrels.

Ostrich Eggs

During the breeding season, we often find red-necked ostrich (*Struthio camelus massaicus*) eggs in the nest that have small holes in them, either from being rolled by the ostrich or by another animal bumping into them. These eggs need to be removed so they do not rot and contaminate the other eggs in the nest. We drain the yolk from the eggs and place them in the meerkat or aardwolf (*Proteles cristatus*) enclosure.

The meerkats especially love to try and break them open. They use all four limbs to probe and break the shell. They roll it, push it, and try just about everything to get inside. Once they succeed, they continue to interact with the pieces for several hours. We have not observed them eating any of them.

Summary

Enrichment is a very important aspect of animal keeping. The behaviors it promotes are beneficial to the well-being of the animals, and that well-being is well worth our time and effort in providing the enrichment opportunities. It is not necessary to always come up with new ideas—it can be enough if you present the same things in a different way or on a varying schedule. Change the presentation of food by dividing the diet into several meals, freezing portions of it, hiding it, chopping it into small pieces, or leaving it whole. Moving around objects in an exhibit or nighthouse, even though they smell the same, will generally cause the animals to mark them all again. However, an exhibit or nighthouse should not be changed to the extent that the animals cannot recognize their home—animals need consistency and security as well as new stimuli. Lastly, if different species are housed in the same nighthouse, like our lions and tigers, you can let, one into the other's empty stall for a while to smell the new area and mark it.

All these ideas are simple and free, but they only work if keepers are willing to take the time to do them. Many thanks to all the keepers who take the time to provide enrichment for the animals in captivity, and special thanks to Tawny Carlson, Jerry Brown, Kay Fielding, Jill Jones, Tracy Fleshman, and Wendy Servoss for their contribution to many great behavioral enrichment ideas. ✧

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Bobcat (*Felis rufus*)

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Mandrill (*Mandrillus sphinx*)