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While reading the following article, each student will have one of the following roles. Please prepare a quad poster and be prepared to present your findings to the class.

Questions:

1. Do animals have friends?
2. What evidence does the article present to support their claim?
3. How subjective is this evidence?
4. Would an animal capable of friendship be favored over one who did not?
5. What is the evolutionary advantage of friendship?

CRISS Roles for article

1. Vocabulary finder
2. Summarizer
3. Evidence Expert
4. Illustrator

Beast buddies: do animals have friends?

Meredith Bashaw says she started looking for social attachments among giraffes because they weren't supposed to have any. She needed a group to contrast with the more sociable animals she was examining as a beginning graduate student several years ago. Big field studies of wild giraffes in the 1970s hadn't found signs that the adults cared much one way or the other about which giraffe was munching on a neighboring tree. "Giraffes just seemed to move about the plains of Africa like random molecules in your coffee cup, says Bashaw.

For the past year and a half, though, Bashaw has been putting that notion to a harder test. Each morning, she has driven around the 90 acres of the San Diego Zoo's Wild Animal Park, keeping track of six of those long-necked molecules. She's searched for a pattern in her data on who hangs around with whom. That issue of preferred associates comes close to the human notion of friendship, and it can prove just as important in understanding animal goings-on as it does in people watching. Baboons, bats, and dozens of other animals have been studied from this perspective. Biologists may start, like Bashaw, by asking whether individuals prefer to hang out with particular buddies. But other questions soon pop up. Does the sex or kinship of a companion matter? Are there benefits to the association? The answers to these questions may have implications for the evolution of human camaraderie.

GIRAFFE SPOTTING Bashaw began her quest to reexamine giraffes at Zoo Atlanta when she heard that the park was going to ship away its male giraffe. Two females had lived for 9 years in the same enclosure with the male without pregnancies. So, Bashaw predicted that the male's disappearance wouldn't elicit much reaction in the two remaining animals.

"Unfortunately, we got a huge reaction, Bashaw says. Both females dramatically increased the time that they spent repetitively licking the fence of their enclosure and pacing. Zookeepers take tics such as these as a sign that something's wrong. Ten days after the male's disappearance, one female had

tapered off in pacing, but the other persisted in licking until the keepers introduced challenging containers for the animals' food supply, which seemed to divert the giraffes from the fence.

The giraffes' distress following the removal of the male startled Bashaw into wondering whether the animals were truly indifferent to their associates.

She couldn't make a fair job of looking for preferences in Atlanta, where there were so few giraffes. But then she moved to San Diego to continue her graduate work, where the Wild Animal Park has 12 Baringo giraffes, making up one of the largest herds in North America. Also called Rothschild's giraffes, Baringos carry a distinctive spot pattern of polygons blurring into leafier shapes.

Bashaw became a connoisseur of spots as she learned to recognize individual adult female giraffes. The zoo photographs baby giraffes' necks and chests, noting spots with unusual shapes that will distinguish the animals throughout their lives. At first, Bashaw had to take the zoo's giraffe baby album into the field with her to tell the animals apart. "Shani has a heart-shaped spot on her neck, and Chinde has an asterisk," she says.

Each morning, Bashaw set out in a truck to follow the giraffes, noting each female's nearest neighbor and any encounters between the animals. Earlier field studies had reported occasional sightings of moms palling with moms when they had youngsters of a common age. But only one mother had a youngster in San Diego.

Mostly, each giraffe there browsed in one spot all morning. "A couple of times a week, something would startle an animal into running away, and Bashaw would roar off after it while simultaneously strategizing to keep the chase on the park roads, continuing to jot data on her record sheets, and watching for rhinos and other moving obstacles. Fortunately, she says, "the speed limit is 5 mph, so you're roaring rather slowly."

The giraffes arrayed themselves in patterns that varied considerably from one day to the next, says Bashaw. During 18 months, however, she found that a giraffe would end up with a particular animal as her nearest neighbor some 15 percent of the time. That's hardly intimate by standards of human friendship, but Bashaw points out that, in contrast, the same giraffe fed near some other individuals only 5 percent of the time.

Kinship makes a difference in the San Diego giraffe associations, she says. The adult group she watched had two mother-daughter pairs, and each member of a pair associated with her relative more often than with the other giraffes.

That pattern makes sense to ecologist Julian Fennessy of the University of Sydney in Australia. He's working with the Namibian Elephant and Giraffe Trust, based in Outjo, on the first detailed study of the Angolan subspecies of giraffe. They feed on the tough shrubbery that borders dried-up riverbeds in the Namib Desert.

Fennessy says he, too, now questions the older view of giraffes as having only loose, casual bonds.

"Maybe it was like that in Kenya," where the old studies were done, he says. But in one of the desert-giraffe populations he monitors, he finds that certain females show up around other females perhaps a third to half the time he sees them. In another population he watches, which for some reason has predominantly males, he finds particular giraffes together more of the time. Fennessy says he's coming around to the view that the Namibian giraffes move around as "a group of close-knit friends, so to speak, plus some other giraffes that come along for a while and then move on."

That fits well with Bashaw's view: "Giraffe social structure is more complex than we thought."

JUST FRIENDS "Friendship is the F-word; a word that primatologists have been reluctant to use in print, though we may use it freely when we chat with our colleagues about the animal we study, Joan B. Silk of

the University of California, Los Angeles said in the February 2002 *Behaviour*, a collection of articles on animal associations. In her essay, Silk acknowledged the risks of calling a poorly understood, non-human behavior by a name that plucks at the human heart. Yet she called on primatologists to collect details about possible friend-shiplike behaviors in other species.

Whether the search fizzles or triumphs, the results will prove interesting, says Silk. If behaviors reminiscent of human friendship fail to matter much in the lives of other animals, the puzzle would be how something so important to our societies arose only in the human lineage. Alternatively, if close analogs to components of human friendship turn up in other species, that pattern may reveal hints to how people's camaraderie evolved.

Primatologists started recording friendship like phenomena decades ago, although there's disagreement on what the observations mean. Barbara Smuts first splashed the F-word boldly across scientific literature in her 1985 book *Sex and Friendship in Baboons* (Aldine Publishing).

Among savanna baboons, bonds between particular males and females form a central feature of society, said Smuts, now at University of Michigan in Ann Arbor. Females actually spend little of their lives sexually receptive. For most of their adulthood, they're either pregnant or lactating. Yet Smuts found particular males and females grooming each other, sleeping snuggled together, and serving as living jungle gyms for the female's infant. If some bully baboon threatened the female, her male buddy rushed to her support. The male had often been a sex partner of the female at some point, but he wasn't necessarily the father of the current youngster. All in all, Smuts compared the relationship to friendship. Silk isn't so sure. Among the baboons, she says, the female typically does more grooming than the male does, and he often loses interest if the youngster dies. Thus, the relationship isn't equal and depends in large part on the presence of a third party, an infant. That, says Silk, gets away from what she sees as the essence of friendship.

Current primate research is moving beyond who's grooming whom and is looking at what drives the relationship. For example, David Watts of Yale University and John Mitani of the University of Michigan in Ann Arbor have been observing chimpanzees in Uganda's Kibale Park since the mid-1990s. The researchers have found close relationships among particular male chimpanzees. Male friendships don't turn up often in nonhuman primates, but among chimps, certain males in a group often groom each other, hunt together, share meat, and come to each other's aid when fights break out. Kinship data so far show no evidence that the males have a preference for maternal kin, the team reported in the February 2002 *Animal Behaviour*.

Doing a friendly favor for a relative makes sense because the kindness benefits shared genes, but befriending nonkin is harder to explain. Theorists have proposed that nonkin social pairings evolve when animals trade favors, such as grooming a troopmate who reliably grooms back or who jumps in swinging during a fight.

Watts reviewed the Kibale Park male chimps' web of interactions in the February 2002 *Behaviour*. He concluded, in agreement with theoretical predictions, that these male pals groom and share meat in exchange for support in fights.

Among blue monkeys in Kakamega Forest in Kenya, females cluster with other females and a male or two. Within these bands, though, certain pairs of females spend extra time grooming or hanging around each other, Marina Cords of Columbia University reported in the February 2002 *Behaviour*.

Cords wonders whether she could use these monkeys to test a new proposal for forces driving friendships. According to this idea, suggested in 2003 by Peter Henzi of the Bolton Institute in England and his colleagues, certain animals may groom with extra enthusiasm those associates that fight in the

front lines when monkey troops clash. In other words, groomers exchange their efforts for a compatriot's military service. The idea caught Cords' attention, she says, because territorial rivalries play a big part in the life of these blue monkeys. Almost every other day, she saw loud bouts of chasing and bluffing, with occasional grappling. Afterwards, the females of each troop "get together and groom like crazy," Cords says. "It reminds me of a sports team."

ODD COUPLES Other researchers have looked for signs of friendship in animals more distant from humans. Hal Whitehead of Dalhousie University in Halifax, Nova Scotia, has worked out methods for analyzing records of disparate sightings of hard-to-observe animals and checking for patterns of association. This type of analysis suggests that female sperm whales don't have particular friends but rather maintain a tight, lifelong group in which it's one for all and all for one.

These clusters of about 10 whales comprise females, often related on their mother's side, as well as their young, explains Whitehead, a biological statistician. From time to time, one group encounters another, and they swim along together for several days.

Whitehead and his colleague Jenny Cristal analyzed four such whale caravans in the eastern Pacific tropics. The whales of one group don't mingle with those of another, the researchers found.

Within its own group, no whale appeared extra likely to position itself near another specific individual. Such homogeneity within the group "is generally not expected," Whitehead says. "Either we haven't looked at it carefully enough yet, or there may be something special about the deep ocean."

If that open vastness does have anything to do with the sperm whales' egalitarianism, Whitehead speculates that it's because the animals don't compete for their food, which tends to occur in huge patches. "In the deep ocean, there's not stuff you can keep to yourself," he says, so inequities are less likely to arise between individuals and partnerships offer little advantage.

In contrast, male bottlenose dolphins have become a classic example of marine mammals that do join up with one or two particular buddies. Richard C. Connor of the University of Massachusetts-Dartmouth and his colleagues watched dolphins in Australia's Shark Bay during the late 1980s and discovered pairs and trios lasting years. The male pals cooperate in herding a female, sometimes swimming or leaping in water-ballet symmetry on either side of her.

Among the nonprimate land animals, vampire bats practice a dramatic form of social bonding. The bats can't go for more than a few nights without a blood meal. If a bat has failed to feed and is rapidly heading toward starvation, another bat in the roost will often regurgitate some of its collected blood. Bats do this even for nonkin. Gerald Wilkinson of the University of Maryland in College Park has found that vampire bats that have been rescued by such feeding are more likely than are other roost mates to return the favor to their rescuers.

White rhinos apparently get a different benefit from buddying up. When the rhino equivalent of teenage males in South Africa's Hluhluwe-Umfolozi Park leave home, they take up with traveling partners along the way, according to Adrian M. Shrader of the University of Witwatersrand. The newbie often chooses a young male more familiar than he is with the immediate locale, Shrader and Norman Owen-Smith reported in the August 2002 *Behavioral Ecology and Sociobiology*. The affiliations can last days or years. Harder to understand though, according to Silk, are the bonds so close and widespread in *Homo sapiens*. She says, "None of our models of reciprocity [among nonhuman animals] can accommodate the psychology of human friendship."