

## G6 Animal Behaviors that Affect Reproduction

### Animal Parenting: What works and who does it best?

**Writing Topic:** G6 Animal Behaviors that Affect Reproduction

#### VOCABULARY WORDS

- 1) Reproduction: to create children
- 2) Offspring: an animal's children. The words "children," "young," and "offspring" all mean the same thing
- 3) Fitness: how good an animal is at making offspring that live to be adults
- 4) Sexual dimorphism: when males and females look different from each other. For example, the male may be a different color from the female.
- 5) Courtship display: the behaviors animals perform to attract mates
- 6) Cooperative breeding: when the young are raised by more animals than just their parents (like aunts and uncles, brothers and sisters)
- 7) Biparental care: when both the male and female parent care for their young
- 8) Infanticide: when a young animal is killed by an adult of the same species, whether it is the parent, a member of the group, or an outsider
- 9) Filial Cannibalism: when an adult eats its young

#### FOUNDATIONAL CONCEPTS

Why do animals have babies? This may seem like a simple question, but **reproduction** (having children) takes a ton of energy. Why spend that energy on a baby when an animal could use it for themselves? The short answer is that animals can live forever through future generations. The more **offspring**, or children, an individual has, the more its genes are passed on, and the higher its **fitness**. Fitness is not how fast or strong an animal is. Fitness is a measure of how good an animal is at making children that will grow up to be adults. The more children, or offspring, an animal has and the longer those offspring live, the higher the animal's fitness.

There are tons of behaviors that affect an animal's reproduction. First, they have to choose a mate. Males don't care who they mate with. They just want to mate with as many females as possible so they can have more children. Females, on the other hand, are usually much pickier in choosing their mates because they have to put more energy into making offspring than the males do. Not only does it take energy for the female to make eggs, but she also undergoes pregnancy if she's a mammal, and is usually the one to care for the offspring after they're born. Because a female has to put so much more energy into reproducing than a male does, she wants to pick the best mate possible so that her offspring have a higher chance of surviving. But how does she know who to pick? She has to be impressed, of course.

The need to impress females led to **sexual dimorphism** in many species, which means that the males and females look different. Some males will be flashy, with brilliantly-colored feathers, while others are big and strong. These physical characteristics can make them more attractive to females. The male peacock, for example, is a striking blue, with large decorative tail-feathers, while the female is a dull brown. The male peacocks who have the brightest feathers are more attractive and a female is more likely to pick them as a mate. The bright feathers tell the female that the male is strong enough to

survive even though predators can easily see him. This strength would be passed down to their offspring, and make them strong, too.



**Figure 1.** These pictures demonstrate *sexual dimorphism* in peacocks. The picture on the left shows the color difference between the blue male and brown female. The picture on the right shows a male spreading his tail feathers in a *courtship display*.

Another way males can impress females is by performing a **courtship display**, which is a set of behaviors used to attract a mate. Lots of species dance or sing to impress the female, but there are some more unique behaviors, too. Male fireflies use light to attract females, and those that flash brighter are chosen more. Bowerbirds build a nest out of twigs and decorate it with blue objects. The females pick the males that use the most blue objects, and then the males have to dance to impress her even more. Male nursery spiders will even bribe the females by bringing a gift of food. Food isn't just a gift though, it's also a way of showing the female that the male has good parenting skills.



**Figure 2.** A male bowerbird constructs a “bower” to impress a female. He will decorate it with the blue objects on the ground, and the more blue objects he has, the more impressed the female will be.

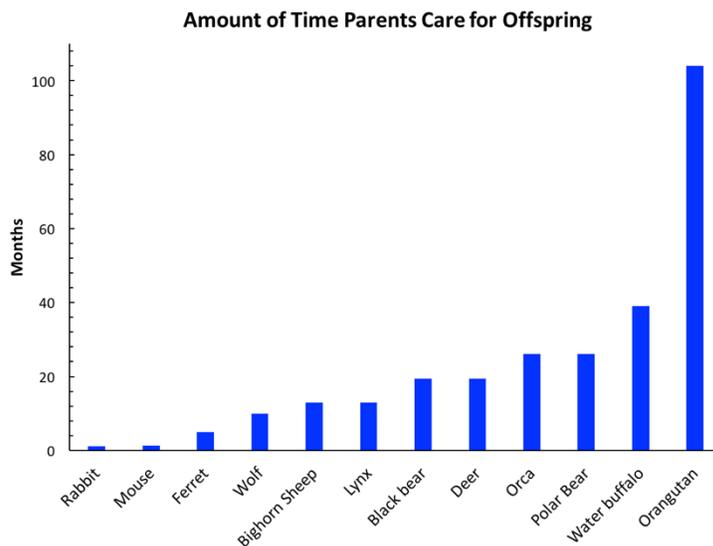
Males don't always perform to impress females; sometimes they fight each other to keep their mate. For example, elk will fight each other with their antlers, while kangaroos lean back on their tail and use



**Figure 3.** These pictures show males fighting to mate with females. On the left, two male elk fight with their antlers. On the right, two male kangaroos box each other.

their hands and feet to box. The winner then gets to mate with the female they're fighting over.

So far we've talked about how an animal chooses its mate. Now, how does an animal keep their offspring safe once it's born? Most reptiles and fish don't care for their offspring at all, and instead produce hundreds of eggs, hoping that a few will survive on their own after they hatch. Mammals and birds, though, usually care for their young after they are born. The amount of care each parent gives will affect the offspring's survival, and is different for each species. Just like in humans, some animals are raised by a single parent, some are raised by two parents, and some have a whole village to help out.



**Figure 4.** This graph shows the number of months different mammal species spend caring for their young. Some species spend very little time with their young, like rabbits and mice that only care for their offspring for about a month. Others spend much longer caring for their young, like the orangutan.

Usually, the female is the only parent to care for the young. Some mothers spend only a few weeks with their offspring, while others may spend years caring for them. For example, female elephant seals will

stay with their pups for about a month, feeding them milk that is 55% fat—that's richer than whipped cream! A month may not seem like a very long time, but the mother will lose up to half of her body weight feeding her pup, going from big and plump to all shriveled up, like a raisin. The orangutan dedicates way more time to her children, caring for them for up to 8 years. During this time, she'll teach her offspring valuable skills, like how to build a tree nest. Orangutans form such strong bonds with their offspring that their adult children often visit them after they've gone their own way.



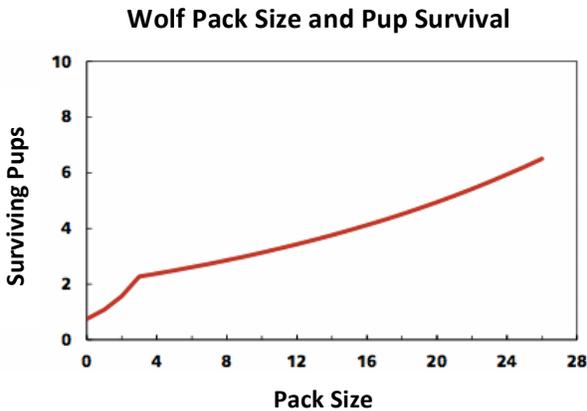
**Figure 5.** An orangutan mother carries her child. Orangutans will care for a single offspring for about 8 years, carrying the child on her back for up to five of those years!

Mothers do most of the heavy lifting when it comes to parenting, but there are still many examples where the father helps out, too. **Biparental care** is when both the mother and father raise the offspring. It is super common in birds, with 81% of bird species parenting this way, compared to only 10% of mammals. Adelle penguins tag-team parenting in the extreme cold of Antarctica. The father will arrive at the nesting site early and build a nest of pebbles—he will even steal rocks from other penguins to make sure that his nest is perfect. The female joins him, and both parents work to keep the egg, and then the chick, warm. They take turns going off to sea for food, and returning to feed the chick. Both parents are so important to chick survival, that the mother will abandon her chick if the male doesn't return because she won't be able to care for it by herself.

Some species parent in groups, with many individuals helping to protect and care for the young—this is called **cooperative breeding**. It's just like when your grandparent, uncle, or brother or sister help take care of you. So far, scientists have found cooperative breeding in 120 mammal and 150 bird species. Wolves are one of these species, and they live in packs that are just like a human family. Wolf packs are led by a male and female, and the rest of the pack is made up of their offspring of different ages. All members of the pack help raise the young, and scientists have even discovered that pup survival increases with more pack members. Some wolves may bring back food for the pups, and others might babysit the pups to keep them safe. So, when there are more helpers around, the pups do better.



**Figure 6.** Adie penguin parents share the responsibility of parenting, with one parent watching the chick while the other goes fishing. On the left, an Adie penguin keeps his egg warm. In the picture on the right, a penguin parent (right bird) feeds its chick (left bird).



**Figure 7.** Wolves are *cooperative breeders*, and the number of animals in a pack is important to pup survival. The graph on the left shows how more pups survive (y-axis) with more wolves in the pack (x-axis). The picture on the right shows a wolf with one of the pack's pups.

We've talked about a lot of behaviors that influence animal reproduction, so let's summarize the main points.

- Animals reproduce to pass their genes on, which increases their fitness
- Females will pick the best males to mate with, but males will mate with any female
- Sexual dimorphism is when males and females look different, and it usually happens when females are picky. Females might pick males that are bigger or more colorful
- Males try to impress females with courtship displays, like dancing or singing
- Species have different parenting styles once the young are born:
  - Reptiles, amphibians, and fish usually don't care for their offspring at all
  - Birds mostly have biparental care, where both the mother and father help raise the chicks
  - Mammals have mother-only care, biparental care, and cooperative breeding, where a whole group raises the young

We've only just skimmed the surface of reproductive behaviors here, and in science there's always more to discover. Scientists are learning new things every day, and you can join them.

### EXPLORING DEEPER

We've been talking all about behaviors that make animals good parents, but what about the bad apples? Believe it or not, there are lots of other behaviors that we wouldn't think of as good parenting, but which actually help increase the parent's reproduction over their lifetime.

**Infanticide** is when a young animal is killed by an adult of the same species, whether it is the parent, a member of the group, or an outsider. Infanticide is common in mammals, and it's all because of milk. Unlike other animals, mammals make milk that they feed to their offspring. The female usually can't mate again until she's done nursing her young, but this can go on for a long time. New males will sometimes kill the young so that the female stops making milk and can mate with them instead. Scientists have seen this behavior in lions, for example, when new males challenge the leader of the pride.



**Figure 8.** Lion mothers often have to protect their cubs from being killed by males, or *infanticide*.

Another type of infanticide is **filial cannibalism**, which means that parents eat their offspring. This behavior mostly happens in insects, fish, and reptiles that guard their eggs. Scientists think it happens when the cost of protecting the eggs outweighs the benefits of having offspring. For example, male fish often guard the eggs all day without getting a chance to eat. By eating some of the eggs, the male will have enough energy to keep protecting the rest, increasing his own chance of survival as well as his remaining offspring's survival. Sometimes, though, if there aren't very many eggs, the male will eat them all. It may be better to eat the eggs and reproduce again, hopefully making even more the second time around. Female skinks, which are a type of lizard, will also eat their eggs in times of need. If the skink is being threatened by a predator while she's protecting her offspring, she'll eat her eggs to stop the predator from eating them—seems like backwards logic. But, eating her eggs also gives her energy, which will help the skink reproduce again in the future.



**Figure 9.** Each black dot in this photograph is a fish egg that the anemone fish is guarding. If he's hungry the father might eat some of the eggs so he can keep protecting the others. Eating your own offspring is called *filial cannibalism*.

Bad parents don't always kill their offspring—believe it or not, but abandoning their young is one way to improve reproductive success. Giant pandas, for example, often have twins, but nurturing two babies takes a lot of work. In fact, caring for both babies would split the mom's resources in half, so neither baby would get enough food to survive. Instead, the mom chooses the stronger cub to care for, and abandons the other. Black bears do almost the opposite of pandas. Normally, they will have 2-3 cubs, but if a bear only has one cub, the energy it takes to keep it alive isn't worth it. Instead, the mother will abandon the cub and save her energy for reproduction next year.

Cuckoos also abandon their young, but instead of letting them die, they just make someone else take care of the chicks. This behavior is called **brood parasitism**, and cuckoos are famous for it. The cuckoo will lay its eggs in the nest of a different bird, like a magpie. The magpie doesn't realize these eggs aren't her own, so she cares for them. Unfortunately, the cuckoo often harms the magpie's eggs as she lays her own amongst them. The cuckoos also hatch earlier and get more food and attention from the magpie mother than the magpie chicks do, which hatch later. As the magpie mom cares for cuckoo chicks, they grow big and strong while the magpie chicks suffer. This cuckoo mom may be a little nuts, but



**Figure 10.** A reed warbler (brown bird) feeds a Common Cuckoo chick. This is an example of *brood parasitism*, where the cuckoo mother lays her eggs in another bird's nest (the warbler in this case), and the warbler raises the cuckoo chick as her own.

abandoning her chicks actually helps them survive, which means that the mom's fitness increases.

How animals reproduce and parent their young can be fascinating, and every species does it differently. It can be misleading to label animals with human words, like "bad parenting," because we don't always understand the effects of their behaviors. Eating your own offspring obviously sounds horrible, but it actually helps fish make more offspring overall. And when pandas abandon a cub, they are trying to help their other cub survive. It just goes to show, you can't judge a book by its cover, even in the animal kingdom.

## **BREAKOUT SECTION**

### **Conservation in Action: Saving the Whooping Crane**

Unfortunately, many species struggle to survive in the wild, and it's often because of human activity. The whooping crane is one species that nearly went extinct because people hunted them and destroyed their homes. Concerned scientists wanted to save the crane, so they created a breeding program to raise chicks in captivity and eventually release them back into the wild. After many years of hard work, scientists were able to save the whooping crane. Part of the reason why the breeding program worked is because scientists studied the parenting behaviors of adult cranes. The first behavior scientists took advantage of is egg abandonment. Whooping cranes usually lay two eggs, but only care for one; scientists took the abandoned egg back to their breeding center to raise it in captivity. The second behavior scientists used was incubation, which means that wild cranes sit on their eggs to keep them warm and safe. The scientists first had real adult cranes incubate the eggs, but when the eggs were a little older, they could use a machine to do it. Another behavior scientists copied was how parents feed their chicks. Once the eggs hatched, scientists used a crane puppet to teach the chicks how to eat on their own, grabbing mealworms with the fake beak and purring, just like the parents do. Finally, scientists even taught the cranes how to migrate by flying with a crane puppet! After years of copying whooping crane parents, scientists were able to introduce new cranes into the wild. All their hard work helped the whooping crane population grow from 15 animals in the wild to 500, saving a species that everyone thought was doomed to extinction.



**Figure 11.** Pictures of the Whooping Crane recovery program. The top picture shows a scientist guiding young cranes through migration using a crane puppet. The bottom left picture shows a whooping crane adult and chick. The bottom right picture shows a scientist with a crane puppet that she used to raise the chicks in captivity.

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## Graphs

Figure 7 adapted from Stahler *et al.* 2016.

Figure 4 was compiled with information from the following sources:

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