Reproduction

Like reptiles, birds reproduce by using internal fertilization and an amniotic egg that resists drying out. Reptile eggs have a leathery shell, whereas bird eggs have a hard shell. During mating, the male bird presses his cloaca to the female's cloaca and releases sperm. A female may lay one egg or a clutch of several eggs.

Parental Care **Unlike most reptiles, most birds care for their eggs and for their young.** Birds usually lay their eggs in a nest. Nests hold the eggs, conceal young birds from predators, and provide shelter from the elements. Most birds build nests in well-hidden spots—ranging from holes in the ground to treetops. Woodpeckers, for example, nest in a hole that they have drilled in a tree. Orioles hang their nests from branches, well beyond the reach of predators. Birds construct their nests from almost any available material. Twigs, bark, grasses, feathers, and mud are common materials used in nests. One or both parents warm, or *incubate*, the eggs by sitting on them. Male emperor penguins incubate a single egg on top of their feet through the Antarctic winter.

Most species of birds form pairs that are made up of a male and a female. Sometimes a male and a female will spend their entire lives together and defend a territory. Even though the pair works together, the eggs laid by the female will commonly have several fathers and the male will fertilize eggs of other females. Once the eggs hatch, the young usually receive extensive parental care. In some cases, as with the African jacana shown in **Figure 14,** only one parent cares for the young. In other species, caring for hatchlings is an affair for the entire family, with the older siblings of the current chicks helping their parents feed the young. Some bird species, such as brown-headed cowbirds, do not care for their own young at all. Instead, they lay their eggs in the nest of another species, and let the other bird raise their chicks!

Reading Check *Explain how different types of birds provide care for their young.*



Figure 14 After an African jacana female lays her eggs, the male incubates the eggs and cares for the young when they hatch. If a predator approaches, the father quickly scoops the young up under his wing and carries them to safety.

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Section 3 Review

KEY IDEAS

1. **Summarize** how birds obtain the energy necessary for flight.
2. **Identify** a bird's adaptations for flight.
3. **Explain** the functions of the anterior and posterior air sacs.
4. **Describe** reproduction in birds.

CRITICAL THINKING

5. **Forming Reasoned Opinions** Some biologists have proposed that birds and reptiles should be grouped in the same class of vertebrates. Do you agree? Support your answer.
6. **Constructing Explanations** Why is it advantageous for birds to be oviparous rather than ovoviviparous?

ALTERNATIVE ASSESSMENT

7. **Making Observations** Design and build a bird feeder. Place the feeder where it can be easily observed. Keep a journal of your observations to share with your class. You may want to keep a bird field guide close to your journal so that you can identify unfamiliar bird species.

Answers to Section Review

1. An endothermic metabolism and an efficient respiratory system move oxygen and carbon dioxide efficiently providing the energy necessary for flight.
2. forelimbs modified as wings, feathers, streamlined shape, lightweight bones, endothermic metabolism, highly efficient lungs, heart with completely divided ventricles
3. These air sacs store and direct air.
4. The male internally fertilizes the female by depositing sperm inside her cloaca. The female lays fertilized amniotic eggs with hard shells in a nest. One or the other parent or both incubate the eggs and then care for the young when they hatch.
5. Sample answer: Birds and reptiles would not belong in the same class because they have different metabolisms, circulatory and respiratory systems, and skeletal structures. In addition, birds have hard-shelled amniotic eggs and feathers while reptiles have leathery-shelled amniotic eggs and scales.
6. Sample answer: If birds were ovoviviparous, it would be much more difficult for them to fly when they were breeding because of the added weight of the fertilized eggs.
7. Students should research both seeds and feeder designs to predict which birds will be attracted to the feeders they design.

Answers to Caption Questions

Figure 13: When the bird inhales, air flows into the posterior air sacs, and from the lungs into the anterior air sacs. When the bird exhales, air from the posterior air sacs moves into the lungs, and air from the anterior air sacs is expelled from the body.

Close

Formative Assessment

Which of the following statements is true of all birds?

A. All birds have feathers, lay eggs, and fly. (Incorrect. The large ostrich, emu, rhea and cassowary are flightless birds, as are the smaller penguins and kiwis.)

B. All birds have special lungs, are endothermic, and lay eggs. (Correct. These are common to all birds.)

C. All birds have beaks, are ectothermic, and lay eggs. (Incorrect. Birds are endothermic.)

D. All birds have feet and legs covered in scales, are herbivores, and lay eggs. (Incorrect. Many birds are carnivorous or omnivorous.)