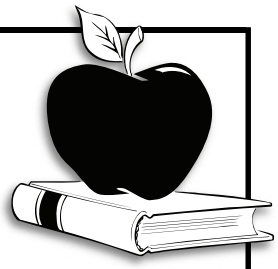
SUGGESTED GRADE LEVELS: 3 - 4

NEXT GENERATION SCIENCE STANDARDS:
3-LS4-3, 4-LS1-1

SKILLS/PROCESSES: observation, classification, prediction, interpretation

OBJECTIVE: Students will identify the various kinds of natural materials used in making a nest and evaluate the amount of effort expended.

TEACHER'S GUIDE



UNIT 2 ■ LESSON 1

House Plans

BACKGROUND

Birds spend varying amounts of time and energy constructing their nest. Some spend days or weeks building a nest, while others simply scrape a small depression in the soil or pile a few twigs together. Still others lay their eggs in the nests of other birds or take over abandoned nests. It is most common for the female to work on building the nest alone. However, sometimes the male alone or both the male and female are responsible for constructing the nest.

Birds use a variety of materials to build their nest. The **environment** in which the bird lives influences the type of materials and location of the nest. Some prairie birds use grasses for nesting material and make their nest on the ground (meadowlarks, bobolink, grasshopper sparrow). Some woodland birds make their nest of plant fibers, twigs and leaves, and locate them above the ground in the branches of bushes and trees (northern cardinal, blue jay, orioles). Other woodland birds nest on the ground (veery, ovenbird).

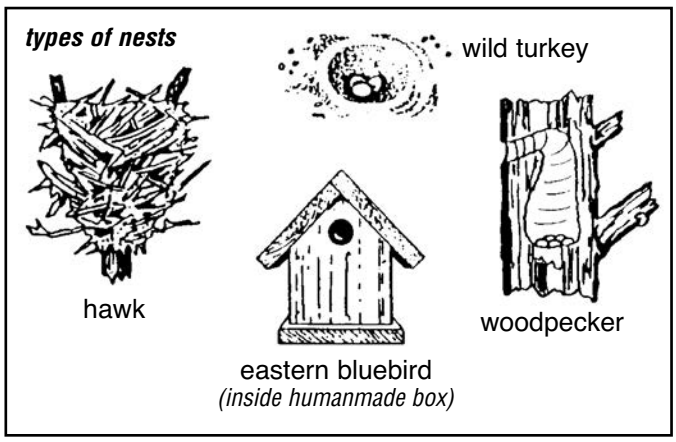
Some birds locate their nest inside a tree **cavity** (nuthatches, woodpeckers, eastern bluebird, eastern screech owl). Whip-poor-wills, nighthawks and killdeer lay their eggs directly on the ground. Urban birds may nest in chimneys, eaves, stop lights and business signs (chimney swift, house sparrow, European starling). Some wetland birds may construct nests on floating mats of vegetation (American coot, pied-billed grebe, rails). Some birds, like the great horned owl, do not build their own nest but use an abandoned nest of another bird (Cooper's hawk, American crow) or mammal (squirrels). Brown-headed cowbirds also do not make their own nests but **parasitize** other birds' nests.

Nesting materials may include mosses, lichens, plant seeds, hair, snake skins and feathers. Chimney swifts use their own saliva as binding material for nests. Some birds use mud to hold nesting materials together (barn swallow, American robin). Birds also use a variety of humanmade items for nests, such as yarn, plastic strips, string, paper and aluminum foil.

Eggs are laid over a period of many days. A nest of eggs is called a **clutch**. Egg coloration and patterning can be the means of protecting eggs while the parent is away (Unit 1, Lesson 1). Most birds produce many eggs with each nesting cycle. Production of a surplus is necessary as many eggs and young do not survive to adulthood.

The time from when the last egg is laid until the last egg is hatched is called the **incubation** period. The length of time for incubation varies among species of birds from 10 days to 12 weeks.

Hatching takes several hours and may even take days. Chicks use their **egg tooth**, a bony tip on the top of their bill, to break through the shell. This period of time is called "**pipping**." They start pecking at the blunt end of the shell where the air sac is located. Chicks have a special "hatching" muscle to help them with this task, and they take many rest breaks.



Care and protection of young birds is a time-consuming process. Some chicks are born fully feathered and able to see (**precocial**). They follow their parent and feed themselves soon after hatching. For example, chicks of the ring-necked pheasant and northern bobwhite are precocial (independent). Other birds are born with their eyes closed and without feathers. These birds remain in the nest to be fed by a parent. Birds such as the American robin and blue jay are **altricial** (dependent). Some birds are able to move their young, using their legs, beak or talons, if danger arises.

American goldfinch fledgling

Raising chicks is an endless, daily chore for the parents, with nonstop flights to gather food and clean the nest. In order to survive, some chicks must eat half their body weight in food each day and may eat thousands of insects before leaving the nest. Some birds are able to produce several **broods** of young each year.

PROJECTS AND ACTIVITIES:

1. Build a Nest: Ask each student to collect three different kinds of materials from outdoors and bring to school the next day, keeping materials in separate bags. Give them suggestions for the types of materials (grass clippings, leaves, sticks, string, pine needles, dead weeds, dirt, fur from their dog or cat) they are looking for, but do not tell them how they will be used.

   Ask each student to make a bird nest. First, students should determine the type of bird they represent and the size of their eggs in relation to the size of the nest. In class have each student build a nest using their materials. To build appreciation for the skill and craftsmanship involved with nest construction, challenge students to use only two fingers, simulating the beak of a bird. Glue may be used to bond materials. Mud nests make a good outdoor group project.

depression nest

EVALUATION

1. Have each student discuss the selection and use of the materials in the nest. How is the nest held together? Where is the nest located in relationship to the ground? Study and compare various types of nests.
2. Discuss the advantage of having a nest on the ground, by the water, in a cavity or in a tree. What is the disadvantage of each? What are the advantages and disadvantages of not building a nest?

EXTENSIONS

- Hatch domestic eggs (duck or chicken) in an incubator in your classroom. Work with a local farmer to obtain eggs and, as a class trip, return the hatchlings to the farm.

- Explore how **toxins** affect eggs. Soak an egg in vinegar for two days. The eggshell will dissolve. Compare this to toxins, such as DDT, that have impacted birds (Unit 3 Lesson 3).

- Locate and count but DO NOT COLLECT OR DISTURB the different kinds of bird nests found outside. Which bird lives in each type of nest? How is the nest made? How far off the ground is it? Try to leave the habitat undisturbed so predators cannot follow your trail.

- Have each student paint a paper egg shape to **camouflage** it for a particular type of setting (tree, gravel, field, sand, etc.) and then go to such areas to see if the camouflage works.

- Watch a bird build a nest. How many days does it take? How far does it fly to gather material? After watching the bird for a few hours, calculate the number of trips per day or per hour. Determine the total number of trips necessary to complete construction. Calculate the total distance flown.

VOCABULARY

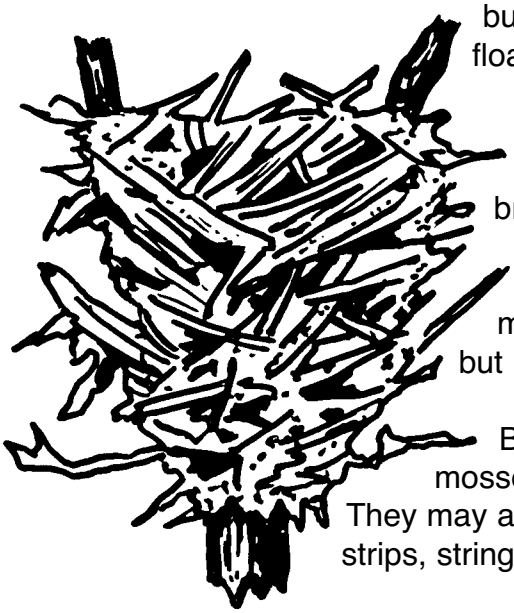
altricial	environment
brood	incubation
camouflage	parasitize
cavity	pipping
clutch	precocial
egg tooth	toxin

House Plans

STUDENT'S GUIDE

Birds spend varying amounts of time and energy constructing their nest. Some spend days or weeks building a nest, while others simply scrape a small depression in the soil or pile a few twigs together.

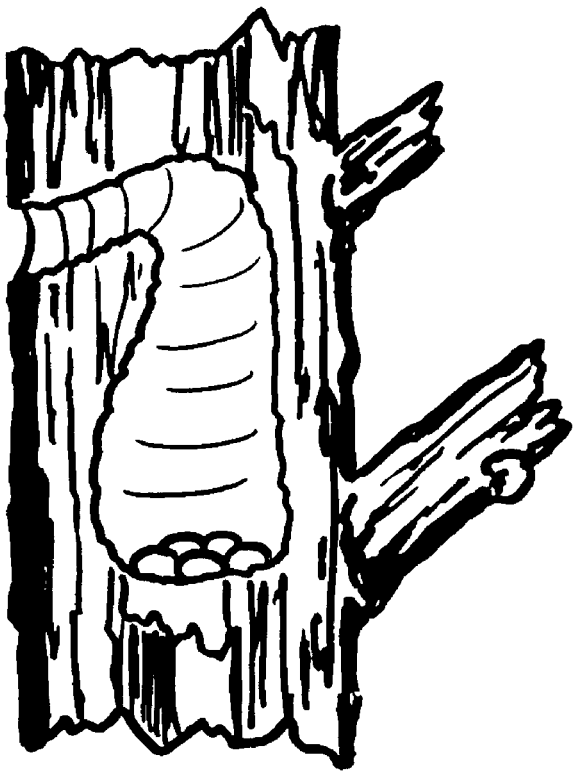
Birds use a variety of materials to build their nest. The area the bird lives in determines the type of nesting materials used and the location of the nest. Some prairie birds use grasses for nesting material and make their nest on the ground. City birds may nest in chimneys, stop lights and business signs. Some wetland birds may construct nests on floating mats of vegetation.



Some woodland birds make their nest of plant fibers, twigs and leaves. Some locate their nest above the ground in the branches of bushes and trees, while others nest on the ground or inside a tree cavity. Some birds, like the great horned owl, do not build their own nest but use the old nest of other animals. Brown-headed cowbirds also do not make their own nest but lay their eggs in other birds' nests.

Birds use a variety of natural materials in their nest such as mosses, mud, lichens, plant seeds, hair, snake skins and feathers. They may also use humanmade items in nests, such as yarn, plastic strips, string, paper and aluminum foil.

Eggs are laid over many days. A nest of eggs is called a clutch. The time from when the last egg is laid until the last egg is hatched is called the incubation period. Hatching may take several hours or even days.



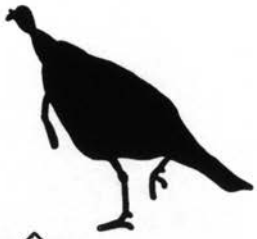
Care and protection of young birds takes a lot of time. Some chicks are born fully feathered and able to see (precocial). Ring-necked pheasant chicks are able to follow their parent and feed themselves soon after hatching. Other birds are born with their eyes closed and without feathers (altricial). American robins remain in the nest to be fed by a parent.

Raising chicks is an endless, daily chore for the parents. Nonstop flights are made to gather food and clean the nest. To survive, some chicks must eat half their body weight in food each day. Some may eat thousands of insects before they leave the nest.

ACTIVITY PAGE

No Place Like Home

Birds build nests to have a place to lay their eggs and raise young while protecting them from the weather, predators and other hazards. Match the birds to the right kind of nest. Think about the many dangers in a bird's daily life. Write a newspaper ad to describe how habitat damage affects birds.





Home Wanted

A home is needed for a local member of our community. This fellow's residence was condemned and has fallen under the bulldozer. He's very quick and is not bothered by noisy chatter. Will only need residence half of the year. Please reply to:

C. Swift
PO Box S.O.S.
Hometown, Illinois

Local Bird Dies

Passing away this Tuesday was a great blue heron. She had been observed earlier that day walking slowly through some local shallows. Nearby residents noticed some sort of toxic substance in the water. Upon discovering the deceased heron officials were contacted to determine the source of the pollutant. Contributions to the Audubon Society or The Nature Conservancy to purchase and preserve the area would be appreciated.