

BIRD NESTS



BACKGROUND

Many animals build nests, and birds are among the most industrious and expert nest builders. Birds build nests to hold their eggs and to raise their young. A nest's location, structure, and coloration provide protection from predators and adverse weather conditions. Some examples of the ways that birds build protected nests: woodpeckers chisel their nests deep into tree trunks; bushtits build finely-woven nests that hang from branches; barn swallows tuck their cuplike mud nests in the eaves of buildings; juncos conceal their nests under low bushes; and a killdeer makes a simple depression in the ground that is often difficult to see because it is camouflaged and blends in with the surroundings.

Birds use a variety of nesting materials. The habitat — where a bird finds its food, water, and place to build its nest — helps determine what materials they will use for their nest. Sparrows use grasses and small roots, hawks and eagles use twigs and branches, and warblers use bark, leaves, and shredded plant stems. Cliff swallows form gourd-shaped nests of mud and straw, and hummingbirds use lichens, cobwebs, moss, and sometimes flowers. Most birds line their nests with soft materials such as feathers, hair, and fine grass. Goldfinches use thistledown, and chipping sparrows line nests with horsehair.

Some birds build a new nest every year, some birds use the same nests year after year, some birds lay eggs in abandoned nests, and others may use materials from old nests to build new nests. Some birds do not build a nest at all, and lay their eggs in the nest of another bird or in a hollow on the ground.

All nests, whether occupied or not, are protected under federal law. No one should disturb nests in any way unless they have a special wildlife permit to study them.

MATERIALS

Each Group Guide will have a kit containing:

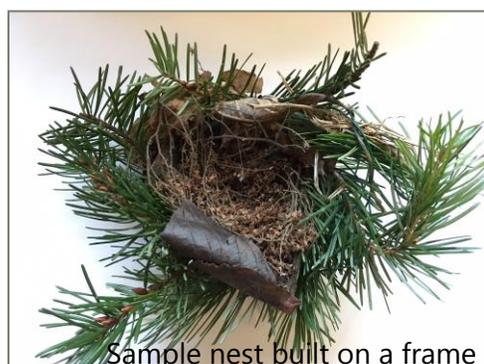
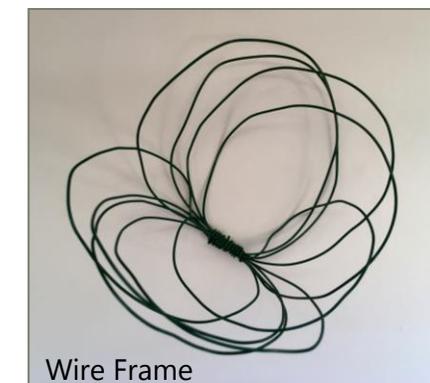
- 1 guide card
- 7 pencils
- 7 hand lenses
- 7 wire coil nest frames
- 1 white board
- 1 dry erase marker
- 1 white board eraser (felt)

TIP Since the children may have difficulty selecting appropriate nesting material, it's helpful for the Group Guide to collect some material from the study site (moss, grass, leaves) ahead of time as examples and to supplement what the students collect.

Site Choose a site that includes a variety of trees, shrubs, and grasses, with an assortment of downed and detached nesting materials.

Vocabulary Throughout the activity be sure to use and reinforce the vocabulary words:

- **engineer** – (*noun*) A person who designs and builds structures to help solve problems.
(*verb*) – To plan and build a solution to a problem.
- **criteria** – The characteristics and requirements an engineer must include in a design for a successful final product.
- **constraints** – Limits to a possible engineering solution or problem, like available resources and materials.
- **camouflage** – Characteristics that allow an animal or object to blend into its environment



Key Learning Objectives

- Students will practice the engineering process of plan, build, test, and retry.
 - ★ In this case the process is more important than the final product.
- The materials used to build nests are dependent on the materials available in a bird's habitat.
- A nest is a place where birds lay eggs and raise young. It is not a year-round home.
- Each species of bird builds a unique nest. Not all birds build nests.

INTRODUCTION by TEAM LEADER (5 minutes)

The Team Leader will introduce the lesson to the entire class before dividing the students into their small field groups.

Introduce the activity to students

- Why do birds build nests?
- Can you think of reasons why you should not disturb or collect bird nests? (some bird species reuse them, it's illegal)
- Does a habitat influence how and where a bird might build its nest?
- What does it mean to be an engineer? What do engineers do?
- Are birds engineers?
- Each student will work to design and build a bird nest that meets all of the criteria and constraints of nest building that the outdoor habitat provides.

OUTDOOR ACTIVITY by VOLUNTEER GROUP GUIDE

The Group Guide will complete the activity with their small field group as described below.

TELL ME (5 minutes)

Gather the students into a circle and point out the study site boundaries

While not looking for any specific answers, facilitate the discussion by asking questions like:

- Where have you seen bird nests?
- In what types of habitats do birds build their nests? (wetlands, forests, deserts, cliffs)
- Where do birds build their nests in these habitats? (in trees or bushes, or on the ground)
- What materials do birds use to build nests? Where do they get these materials?
- What are the important characteristics of a nest? (It can hold the parent/eggs/young, is sturdy enough to withstand various weather conditions, is camouflaged in the habitat, located in an area that is easily accessible to the parent birds)

Keep in mind . . .

- Nesting materials that the students collect should follow the 4 D's: Dead, Down, Detached, or Dandelions (weeds)
- Remind students that building nests is difficult and they have very limited time to build theirs. Birds generally take several days to weeks to make theirs, and birds care about function - not about how it looks.

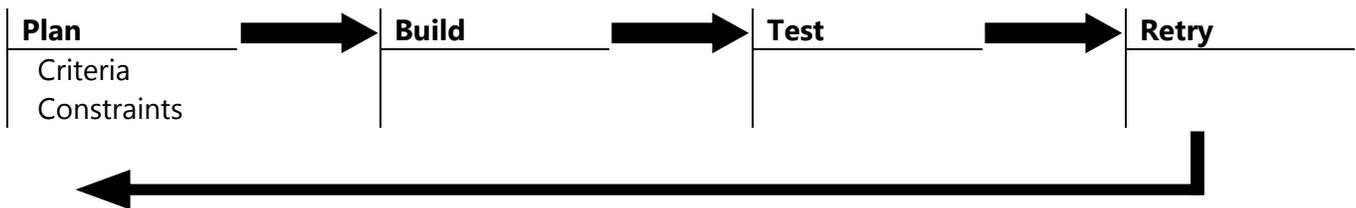
State the challenge: Today we will be engineers and our goal is to design and build a bird nest. We will plan how we will build the nests - thinking about what will make our designs successful and what may be some challenges – and then build and test our nests in the schoolyard habitat.

ACTION (25 minutes)

1. Reiterate the boundaries of your study site

2. Introduce the activity using the white board

Define the problem the students will solve. Write: Build a model of an ideal nest for the schoolyard habitat. Outline the process they'll follow to solve the problem:



3. Think, pair, share: Have the students think on their own about the criteria for successful nest building and constraints they may face. Then have them pair up with another student and share their ideas together. They are to record their ideas in the PLAN portion of the chart in their student folders.

- Once the pairs have finished brainstorming, have them share their ideas with the group.
- Record new ideas on the white board for the entire group to see.
- When the entire group has shared all of their ideas, move to the BUILD step.

4. Demonstrate how to prepare the nest frame. Give each student a wire nest frame. Have the students follow along while you demonstrate how to arrange the nest by fanning out the wire “petals” and rounding the frame over an elbow.

Keep in mind... Always leave the nest frames with the student folders during materials collection. The wire frames are very easy to lose.

5. **Collect the materials.** With the criteria and constraints in mind, have the students collect nesting materials. Remind them of the four D's (dead, down, detached, dandelions/weeds).
6. **Weave the nest (BUILD):** Once the students return with their nesting materials, demonstrate how to weave materials into the frame. Start with twigs, grass, or leaves and weave in a random pattern. This is not easy, so be sure to encourage the students. Let them know that none of the nests will look like a real bird nest and that perfection is not the goal. Let students know they have about 10-15 minutes to build their nests.
 - Sit together as you build the nests and discuss nest building.
 - Who taught the bird to build a nest?
 - How do birds weave materials when they do not have thumbs?
 - How long do you think it takes a birds to build a nest?
 - Do you think birds use the same materials in the inside of the nest as they use on the outside?
7. When complete, have the students complete the BUILD portion of the chart in their student folders.
8. **Remind students of the nest criteria they generated during the PLAN phase.** Is the nest sturdy enough to withstand bad weather? Is it woven tightly enough so that an egg or baby bird won't fall through a hole? Does it have a soft lining for eggs and nestlings? Will it blend in (i.e. camouflage) with the habitat?
9. **TEST each nest.** Students may check off the box in the TEST portion of their field notes if they pass.
 - Place a small stone in the nest (like an egg). Does it stay in the nest?
 - Lightly shake and bump the nest, simulating a bumped branch or a windstorm. Does the nest hold together?
 - Place the nest in the habitat in the area where the students listed in their design plan in their field notes. It should be in an area that will allow easy in and out access by the birds. Is it sufficiently camouflaged?
10. Once the TEST portion is complete, have the students fill out the RETRY portion, thinking about improvements that could be made to each nest.

If there is time...

You can have the students place their nests in different spots within your study area to determine where it is best camouflaged. Why is the nest better camouflaged in some areas, less so in others?

DISCUSSION (5-10 minutes)

Group Guides will find most of these questions on their guide cards in the activity kits.

Encourage the students to reflect on their observations.

- Was it easy to build a nest? Why or why not?
- What did you need to **RETRY** after testing your nest? What changes did you (or would you) make?
- Do all birds use the same materials to build their nests? (small vs. large birds, different habitats - desert vs. beach vs. forest)
- How can birds build a nest strong enough to hold eggs and baby birds?
- Which locations might provide the greatest protection against predators? Against the weather? Why?
- How do humans impact where and with what materials birds build their nests?

STUDENT JOURNAL (5-10 minutes)

Have the students complete the Bird Nests worksheets in their field journal.

CLEAN UP

The importance of clean-up is critical to the smooth operation of the program. Children are expected to help.

1. Collect and organize all materials. Put the activity materials back into the kit.
2. Wrap the strings around all hand lenses and return them to their plastic bag in the kit
3. Remember the goal is to leave no trace. Scatter all unused nesting materials back into the habitat.

IF THERE IS TIME . . .

Have the groups make changes to their nest by adding, changing, or modifying their designs.

CONCLUSION by TEAM LEADER (5 minutes)

After all the field groups have returned to the classroom, the Team Leader will do a brief wrap-up discussion at the end of the lesson.

Concluding questions

- What materials worked well for building nests?
- Is the location of a bird nest important? Why?
- How does the habitat influence how birds build their nests?
- What do you think would happen to a bird if it failed to build a successful nest?
- What changes would you make to your nest design if you were to build the nest again?

Talk briefly about the next activity.