

Colonial Nesting Birds



SUGGESTED GRADE LEVELS: MS

SUBJECT: Science

SKILLS: analysis, generalization, graphing, inference, listing, public speaking, reporting, research, small group work, writing

CORRELATION TO NEXT

GENERATION SCIENCE STANDARDS: MS-LS2-1, MS-LS2-4

Objectives

Students will: 1) become familiar with the practice of colonial nesting, its advantages and disadvantages; 2) recognize some Illinois wetland colonial nesting birds; and 3) analyze trends in a graph.

Method

Students prepare a short report and complete a graphing exercise.

Background

About 13 percent of the world's birds are colonial nesters. These birds each require a nest site that is surrounded by nests of other similar birds. The place where these clustered nests are found is called a rookery. Ordinarily, colonies are made up of a single species of bird, but sometimes two or more species may be present. This is particularly true of species such as herons and egrets that require similar nesting sites. Nests may be at any height, but often are placed in the tallest trees in the area. The number of nests in a colony varies greatly. For instance, great blue herons nest in colonies ranging in size from a few pairs to 1,000+ pairs. In all true colonies, each nesting bird owns and defends a small territory around its nest—a territory that usually corresponds to the reach of its owner's wings or beak.

Birds in these sites have the advantage of cooperative defense against predators. As a general rule, the larger the colony, the more successful this defense is. Large numbers of nests may lead to "predator saturation." Eggs and nestlings are a good food source for many predators, but they are present for only a short time. For example, great blue heron nestlings can stand at three weeks, walk on tree limbs at five weeks and fly at seven weeks after hatching. Predators may not have time to build or maintain populations large enough to take full advantage of the resource.

Social interactions related to foraging may be a reason for colonial nesting in species with unpredictable food supplies that are patchy but locally abundant. Some birds, however, nest colonially and forage alone. Herons, for instance, use stealth to hunt food and forage alone. Herons seem to learn a great deal about how

productive remote feeding sites are from other birds in their breeding colonies. This gathering of information seems to aid young birds greatly.

In Illinois, great blue herons, great egrets, snowy egrets, little blue herons, cattle egrets, black-crowned night-herons and double-crested cormorants are all colonial nesting birds. They are not the only colonial nesting birds in our state, but they are large, easy to identify and their population trends have been tracked to some extent. They are also wetland birds. The number of individuals of each of these species in Illinois has varied over time. Natural predators include crows, raptors and raccoons. Human actions like deforestation, draining wetlands and applying pesticides have been devastating. Humans can also create wetlands, preserve natural wetlands, apply pesticides with caution and follow other good conservation practices that will benefit the birds.

Materials

colored pencils or crayons; graph paper; copies of the "Colonial Nesting Birds Graphing Exercise;" writing materials; bird field guides and research/reference materials

Procedure

1. Discuss colonial nesting birds with the students. Introduce the terms "colonial nesting birds" and "rookery." Be sure that students are familiar with the meaning of these terms.
2. Talk about some of the wetland colonial nesting species that may be found in Illinois (great blue heron, great egret, snowy egret, little blue heron, cattle egret, black-crowned night-heron, double-crested cormorant). Show the students pictures of these species. Use bird field guides and other references to find illustrations.
3. In small groups, have students briefly research each of these species and make a report to the class. Include food habits, migration habits and other information about life history in the report. Include historical information that the students may find about the species (particularly, human use of feathers).

A good resource to use for life history information is the Illinois Natural History Survey's Web page at www.inhs.illinois.edu/animals_plants/birds/ifwis/birds/.

- Assign the graphing activity that follows. Students may work in small groups or as individuals. Review basic graphing information with them.
- Discuss results with students. Have them explain any obvious trends.

Extensions

- Have students write a short story describing life in a rookery. Each student should pretend to be a nestling or adult in the rookery and write from the point of view of that bird. Be sure to include how the place looks, smells, feels and sounds. Tell about your food and where it comes from. Remember, chances are you are in the top of the tallest trees. Other points to consider: waste disposal; weather; predators; insects; sturdiness of nest.
- Some rookeries contain thousands of nests. Propose ways that individual birds may find their own nest.
- Compare a rookery to an apartment complex. How are they alike? How are they different?
- Research other colonial nesting birds found in the world. Compare/contrast to the seven species studied here.
- Report on Harriet Hemenway (1858-1960) and Minna Hall (1859-1951) who started the Massachusetts Audubon Society over a bird hat protest movement. Read the book *She's wearing a dead bird on her head!* by Kathryn Lasky from Hyperion Books for Children, New York (1995), which offers a tale about these two ladies and their efforts.
- The Illinois Wildlife Action Plan (<http://www.dnr.illinois.gov/conservation/IWAP/Documents/WildlifeActionPlanFinal.pdf>) lists four colonial nesting birds (great egret, little blue heron, snowy egret and black-crowned night-heron) as Species in Greatest Need of Conservation. Species in Greatest Need of Conservation include threatened and endangered species as well as species that are rare, localized or declining, or worthy of attention. What factors have led biologists to declare each of these four species as a Species in Greatest Need of Conservation?
- In 2009 the first known nesting colony of American white pelicans in Illinois took up residence on Woodruffs Island in northwestern Illinois on the Upper Mississippi River National Wildlife and Fish Refuge. Limited preferred nesting habitat on two small islands resulted in a small group of birds moving into Illinois from a nesting colony in Iowa. A pelican's nest is simple: a slight depression in the sand rimmed with sticks or other debris where they lay two or three white eggs. Compare/contrast a white pelican colony to the seven species studied here. Consider nest location; feeding habits; flood tolerance; interactions with other social nesters.

- The first systematic bird survey in North America occurred in 1906. Repeated in 1950 and again from 2006-2008, the survey provides a unique opportunity to quantify changes in Illinois' bird community (*INHS Special Publication 31: Illinois Birds*). What does the following chart of the relative abundance of great blue herons (GBH), great egrets (GE) and little blue herons (LBH) seen in marsh habitats tell us about population changes over a century? What does it say about the colonial nesting species numbering too low to be listed?

	GBH	GE	LBH
1900s	—	—	—
1950s	0.3	—	—
2000s	1.6	0.7	1.6

Evaluations

- Most rookeries are found in bottomland forests along rivers. Why do you suppose this statement is true?
- What are two advantages and two disadvantages of living in colonies?
- Students should successfully complete and submit their graphing exercise.
- A rookery that has been present at a single site for many years may be completely gone the next year. List three reasons that a rookery might disappear.
- Students will be evaluated on their report/presentation.
- Students should be able to identify the seven birds discussed when shown photographs or illustrations of them.

References

- Ehrlich, P., Dobkin, D. and Wheye, D. 1988. *The birder's handbook, a field guide to the natural history of North American birds*. Simon and Schuster, Inc., New York. 785 pp.
- Welty, J. C. 1975. *The life of birds*. W.B. Saunders Company, Philadelphia, Pennsylvania. 623 pp.



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DNR 56 – 12/15 • IOCI 16-0306

STUDENT ACTIVITY PAGE | Colonial Nesting Birds: Graphing Exercise

Name(s) _____

Since 1983, surveys have been taken by the Illinois Department of Natural Resources to determine the size and composition of colonial waterbird rookeries in Illinois.

The number of nests in a rookery is determined by aerial estimates and/or ground counts. Aerial estimates are taken by flying in a twin-engine airplane past the rookery once or twice about 500 feet above tree-top level. The observer counts nests and records numbers and types of birds present. During these brief flights it is difficult to tell which nests are active and which are inactive. It is also hard to see nests that are below the tree canopy. Ground counts are more accurate than aerial counts, since the observer can stand under the trees, watch the birds and count the nests for a long period of time. Both methods, however, are treated as estimates since errors do occur. Using the same methods year after year does allow comparison of data.

1. Use the following information to prepare two graphs.

Title the first graph "Rookeries." Label the x-axis (horizontal line) "Years." Label the y-axis (vertical line) "Number of Rookeries." Look at the data that you will graph, then divide each axis into the appropriate units of measure.

Title the second graph "Nests." Label the x-axis (horizontal line) "Years." Label the y-axis (vertical line) "Number of Nests." Look at the data that you will graph, then divide each axis into the appropriate units of measure.

2. Graph the following data. Use this color scheme.

great blue heron (GBH) = blue

great egret (GE) = yellow

snowy egret (SE) = green

little blue heron (LBH) = purple

cattle egret (CE) = orange

black-crowned night-heron (BNH) = black

double-crested cormorant (DCC) = red

GRAPH 1 | Number of Rookeries

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GBH	68	60	62	82	75	46	18	11	13	8	18	9	25	18	12
GE	22	18	23	18	18	5	4	3	3	4	2	2	3	3	4
SE			1	1											
LBH			1	1									1		
CE	1	1	2	1				1							
BNH	2	3	5	6	3	4	2	2	2	2	1	2	1		2
DCC	3	3	4	5	3	4	1	2	2	3	1	3	3	2	4

STUDENT ACTIVITY PAGE | Colonial Nesting Birds: Graphing Exercise

GRAPH 2 | Number of Nests

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
GBH	9449	9440	10734	12021	9702	4574	3025	1782	2007	2284	1020	947	2534	1053	1382
GE	1596	1619	1968	2268	2183	751	604	643	552	520	135	183	321	120	213
SE			10	30											
LBH			237	600									5		
CE	5	1	314	600				1							
BNH	395	513	405	1105	46	398	56	63	65	53	8	12	13		218
DCC	460	415	473	949	547	746	547	863	690	789	259	326	630	428	741

3. Which species had the greatest number of rookeries in Illinois each year? Is the number of rookeries increasing or decreasing over time?

4. Which species had the greatest number of nests in Illinois each year? Is the number of nests increasing or decreasing over time?

5. Compare the number of rookeries and nests per year between the great egret and double-crested cormorant. What trends do you see?

6. How could increasing numbers of nests of one species lead to decreasing numbers of nests of another species? Give at least two reasons.

7. The average size (height) of these seven birds is as follows: great blue heron 42-52"; great egret 38"; snowy egret 20-27"; little blue heron 24"; cattle egret 20"; black-crowned night-heron 23-28"; double-crested cormorant 33." (Peterson, R. T. 1980. *A field guide to the birds east of the rockies*. Houghton Mifflin Company, Boston. 384 pp.)

A. Do you find any relationship between the size of the birds and the number of rookeries? If so, what is the relationship?

B. Why would the size of the bird have anything to do with the number of rookeries built?

C. What besides size of the bird could affect the number of rookeries constructed?

STUDENT ACTIVITY PAGE | Colonial Nesting Birds: Graphing Exercise

8. How do you interpret the results for snowy egrets, little blue herons and cattle egrets?

9. What are some problems with the survey methods described above? List at least two. Could there be more rookeries that may not be recorded? What could be done to improve the survey methods and obtain more accurate data?

10. The cattle egret is a recent immigrant to Illinois. Using your graphs, describe how the cattle egret's presence has affected the other species represented.
