

Nest Box Trails & Native Bird Species

BUCKEYE LEADERSHIP WORKSHOP



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Nest Box Trails & Native Bird Species

Session Summary: Class participants will learn about native Ohio cavity dwellers (primarily bluebirds) including habitat, nest box construction, invasive species competition, and installing a bluebird trail in their home community. Participants will make at least 2 bluebird boxes complete with predator shields. This information is easily transferrable to schools, camps, and park and recreation departments interested in having a teaching tool for outdoor education. The class information can easily expand to include basic science, math, and language arts concepts for school groups.

- I. Goals
 - A. Learn history of some cavity-dwelling songbirds in Ohio
 1. bluebirds
 2. tree swallows
 3. wrens
 4. chickadees
 5. competing invasive species
 - B. Competing invasive species
 1. Primary invasive species are starlings and English sparrows
 2. Origins of the invasive species
 3. Identification of these birds
 - C. Habitat Discussion
 1. Food
 2. Water
 3. Shelter
 4. Space
 - D. Construct 2 birdhouses
- II. Make Bluebird Boxes
 - A. Materials
 1. Cedar fence pickets
 2. Wood screws (hex head preferable)
 3. Hardy-board plank siding
 4. Thin-walled PVC drain line
 5. PVC pipe end caps
 6. Electrical EMT conduit
 7. Plumbing / electrical conduit strap
 8. Band clamps
 - B. Cost Estimates
 1. Cedar fence pickets:
 2. Wood screws:
 3. PVC drain line
 4. Plumbing / electrical conduit straps
 5. Hose clamps

- C. Tools
 - 1. Tape measures
 - 2. Saws
 - 3. Drills
 - 4. Screwdrivers / bit drivers
 - 5. Hole saws
 - D. Materials sources
 - 1. Big box hardware store (Lowe's, Home Depot, Menards)
 - 2. Plumbing supply houses
 - 3. Local contractors
 - E. Installation of the completed bird houses
 - 1. 3-foot piece of #4 reinforcing steel (rebar)
 - 2. Hammer
- III. Tour of the bluebird boxes at Recreation Unlimited
- A. Nest identification
 - 1. Bluebirds
 - 2. tree swallows
 - 3. wrens
 - 4. chickadees
 - 5. competing invasive species
 - B. Invasive species concerns
 - 1. Displacement of native species
 - 2. Competition for food sources
 - 3. Predation of native species chicks
 - C. Monitoring your boxes and nests
 - 1. Frequency
 - 2. Dealing with unwanted guests (invasive species)
 - 3. What to do with old nests
- IV. Connections to Classroom and Community settings
- A. Presenting nesting information
 - B. Combining outdoor education with classroom goals and fundamentals
 - C. Making kids (of all ages) excited about nature!
 - D. Lesson plan examples
 - E. Camps and recreation programs

Bluebird Box Construction Instructions

1. Cut cedar fence picket to length
 - i. Four (4) pieces at 9 inches length
 - ii. One (1) piece at the board width minus two board thicknesses. This is usually about 4 ¾ inch length
2. Cut a 1.5-inch diameter hole in the front board based on the dimensions shown on the attached drawings. Use a spade bit or hole saw for this procedure. Make sure that you have a scrap backing board below your piece to protect the floor/table/work surface!
3. Insert one side piece, the back piece, and the other side piece into the jig/template provided. The side pieces will be vertical. The back piece will be horizontal. Make sure that the roughest side of each piece is facing the inside of the box.
4. Attach one side board to the back board using three screws. (Pre-drill 1/16 or 3/32-inch pilot holes before installing the screws! This will help prevent the cedar wood from splitting. Pre-drill pilot holes throughout the box construction). Position screws about 1 inch from each end of the board. Use a third screw near the center of the board. (Use the provided jig to make this task easier)
5. Reverse the box and attach the other side piece using the same procedures.
6. Stand the box up to a vertical position. Insert the bottom board and make sure that this piece is tight to the back of the box. (Drill pilot holes and attach these side screws one at a time). Attach a single screw near the center of each side.
7. Next, attach the bottom piece to the back of the box using two screws. Position those screws about 1 inch in from each side.
8. Attach the front piece with the hole. Again, make sure that the rough side is facing in. Allow for a 0.75 inch gap below the adjacent side boards. This gap is to allow for air ventilation and to prevent the birdhouse from getting too hot on a warm/sunny day. Hole should be closer to top of box – not upside down!
9. Measure down 1.75 inches on each side piece. Fasten the front piece to the sides using a single screw on each side, installed at the same distance (1.75 inches) from the top. These two screws will serve as a hinge when the door is opened and closed. Having these two screws installed at the same location on each side will be important to operating the door.
10. Fasten the bottom of the door to the bottom of the box with a single screw installed near the center of the door. This screw can be left up a little bit to make it easier to open/close the door in the future.
11. Place the pre-cut hardy-board plank siding upside down (smooth side up) on a table. Make sure that the long direction of the roof and the long direction of the bluebird box are in the same direction. Invert the bluebird box and position the box as close to center as possible. You can use a ruler/tape measure to center the box or simply eyeball the positioning.

12. Make pencil marks on the roof piece at each corner of the box. These will be about 1 inch long marks showing the corners.
13. Drill four pilot holes through the roof. Locate the pilot holes about 1 inch in from the front and rear of the box and fasten the roof screws to the sides of the box (not the rear or front pieces).
14. Reposition the box on the lid. Carefully invert the box so that the unit is standing upright. You will need to set the box at the edge of the table to allow the door piece to hang over the edge.
15. Drill pilot holes through the roof and into the side pieces. Attach the roof using the same screws used in the rest of the box construction.
16. Attach the pipe straps/brackets to the short (2-foot long) section of EMT conduit. Use a short, self-tapping screw for this.
17. With the straps/brackets attached to the short (2-foot long) piece of EMT conduit, position the pipe to be flush against the top lid of the next box. Find the center of the back piece and align the conduit with the centerline of the back of the box. Mark and drill pilot holes for the pipe straps/brackets that will attach to the back of the next box.
18. Attach the ½-inch diameter EMT conduit connector to the bottom (5-foot long) sections of the pole.
19. Go install your spanking new nest boxes at a desirable location! Best locations are as follows
For Bluebirds:
 - A. About 5 feet to 6 feet off of the ground.
 - B. Hole facing southeast.
 - C. Also face the holes away from roads, if possible.
 - D. Away from brushy areas.
 - E. Ideally close to a tree where babies can perch after they fledge.
 - F. Placed in pairs about 10 feet apart.
 - G. Space the pairs 100 to 150 feet apart.

For Tree Swallows:

- A. About 5 feet to 6 feet off of the ground.
- B. Hole facing southeast.
- C. Also face the holes away from roads, if possible.
- D. Away from brushy areas. Typically more open, meadow/pasture areas than bluebird habitat.
- E. Ideally close to a tree where babies can perch after they fledge.
- F. Placed single boxes about 75 feet apart in a triangle pattern.

20. Install the next box by driving a #4 (1/2-inch) piece of reinforcing steel (rebar) into the ground. For our purposes, a 4-foot piece of rebar driven 2 feet into the ground will work.
21. Slide the 5-foot long piece of EMT conduit over the rebar stake.
22. Attach the top, shorter piece of EMT conduit to the connector. Tighten the connector with a square drive or slotted screwdriver.
23. Attach the predator guard to the pole. (see predator guard instructions below).
24. The predator guard is just one 2 to 3 feet section of 3-inch diameter, thin-wall PVC pipe with an end cap glued onto one end. Drill a 3/4-inch diameter hole in the center of the end cap. This will slide over the EMT conduit pole.
25. Attach the next boxes to the poles using 3/4 inch long screws. Use screws that do not protrude into the nest box. Screws or nails extending into the nest box could injure young baby birds as they prepare to fledge!
26. If desired, you can apply a coat of linseed oil to your bluebird boxes to help prolong their life span. Repeat this every year – preferably in early October before wet/winter weather.
27. Check your bluebird box often for nuisance birds. With a little luck and time, bluebirds will soon be nesting in your boxes. Remember - wrens, chickadees, and tree swallows may also decide to set up shop and are welcome guests. English sparrows and the dreaded starlings are invasive species and can be kicked to the curb should you so desire. Weekly checks will help prevent any invasive species eggs from hatching. (Young audiences understand this easier with eggs than cute baby sparrows).
28. Do not open boxes with chicks that are 12 to 13 days old. Nestlings may be startled out of the box before they are ready. Monitor active boxes by sound. No chirping and/or no parents nearby means the babies have fledged.
29. Consider keeping an entry log/journal of your nest box activity. Recruit neighbors (of any age) to partner with you for weekly checks and documentation. This is a great way to encourage people to appreciate our natural world and be involved in the home environment – wherever that may be!

Bibliography / Resource Recommendations

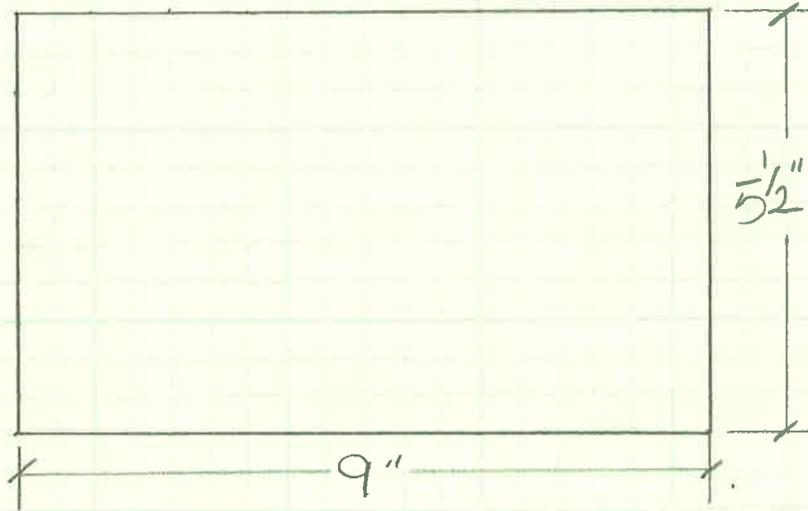
1. North American Bluebird Society
<http://www.nabluebirdsociety.org/>

2. The Cornell Lab of Ornithology
www.nestwatch.org

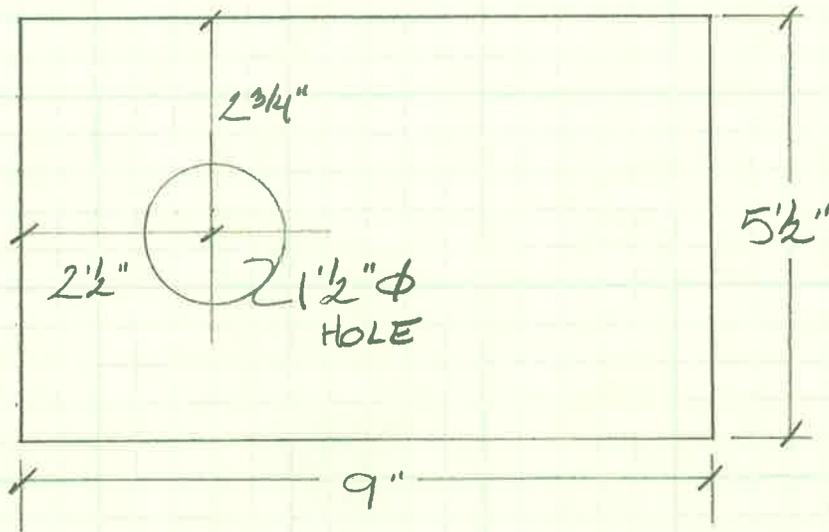
Merlin Bird ID App (smart phone)

3. Sialis.org
www.sialis.org

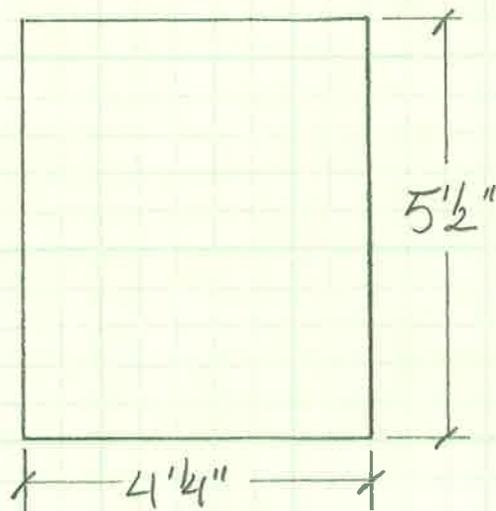
4. National Audubon Society
www.audubon.org/field-guide/bird/eastern-bluebird



3 PCS.
 (2 SIDES &
 1 REAR)

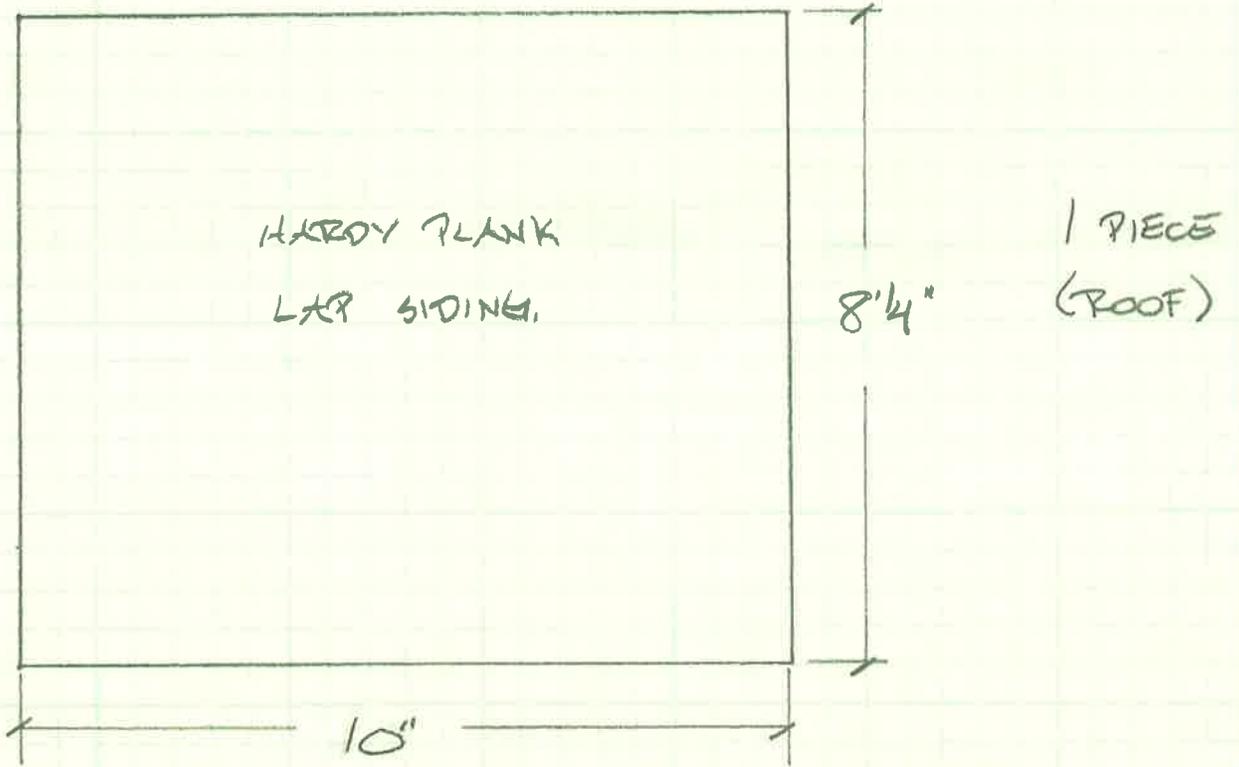


1 PIECE
 (FRONT OF
 BOX)



1 PIECE
 (BOTTOM)

ALL PIECES THIS TAKE
 C 6" CEDAR FENCE PICKETT.





1. Locating center point to drill entrance hole.



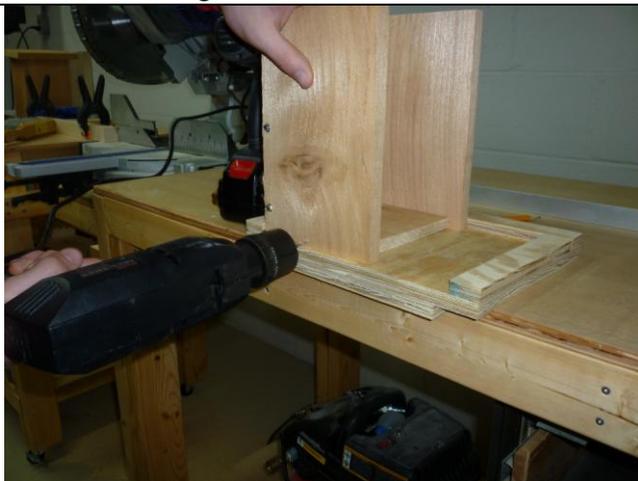
2. Drilling hole with 1.5-inch spade bit. Note scrap wood below.



3. Pieces in jig and drilling pilot holes for attaching side board.



4. Attaching side board with screws. Note jig braced on side of workbench/table.



5. Box vertical in jig and attaching bottom piece with single side screw.



6. View of box bottom installed. Note that bottom is snug at back of box with room in front for door.



7. Fastening bottom with two screws at back/rear of box.



8. Preparing to install front of box with $\frac{3}{4}$ -inch below top to allow for air circulation gap.



9. Front facing down and installing single screw on each side. These screws will act as hinges.



10. View of front after installation. Note air gap at top and "flap" at bottom of box.



11. Box upside down and centered on roof. Marking corners to pre-drill roof holes.



12. Marking hole locations for pre-drilling. Note to drill holes on sides of box footprint area (not front or back).



13. Pre-drilling holes through the roof. Note holes are on SHORT side of bluebird box.



14. Re-centering box upside down on roof with holes pre-drilled.



15. Roof re-centered on box and ready to attach with 4 roof screws.



16. Attaching roof with 4 screws on SHOT side of box footprint.



17. View of 5th roof screw installed OUTSIDE of bluebird box footprint. Screw will go inside of mounting pole.



18. Measuring for the strap clamp on the back side of the bluebird box.



19. Pre-drilling holes for pipe strap on the back of the box.



20. Attaching screws for the pipe mounting pole. DO NOT screw these all of the way in!



21. Pipe strap attached to rear of box.



22. Mounting pole of ½-inch EMT conduit (5-foot long) installed through strap and 5th roof screw inside of pole.



23. Completed bluebird box on mounting pole – ready to install!



24. Teenager photo-bombing his own photo of completed bluebird box.

Bluebird Basics Materials List

Item	Use
Cedar 5/4 x 5 1/2 x 6' Cedar Fence Pickets	The cedar fence pickets will be used for the four sides and bottom of the bluebird boxes.
Hardy Plank Siding	The hardy plank siding will be used for the roof of the bluebird boxes. You may be able to get broken and/or scrap pieces for free from your local hardware store.
#8 x 1.25" Sheet Metal Screws (75 count)	These screws will be used to construct the sides of the box, attach the hardy plank siding lid, and serve as the "lock" for the door.
1/2-inch EMT Conduit (10 feet)	This will be the mounting pole for the bluebird boxes. You get two 1.3 poles (6 feet total) from a single 10-foot piece of conduit.
3-inch PVC Pipe (predator guard)	The PVC pipe serves as the predator guard for the bluebird box.
3-inch PVC Pipe Cap	The PVC pipe cap attaches to the predator guard and rests on top of the #4 hose clamp.
1/2-inch EMT conduit connector	The conduit coupling connects the lower (4-foot piece) to the upper (2 foot) piece & supports the predator guard.
1/2-inch EMT conduit strap	The straps attach the next box to the 1/2-inch EMT conduit pole.

Bluebird Basics Materials Cost List

Item	Quantity	Pieces	Cost	Cost Per Piece	Multiplier	Cost/Box
Cedar 5/4 x 5 1/2 x 6' Cedar Fence Pickets	1	4.5	\$ 3.00	\$ 0.67	1	\$ 0.67
Hardy Plank Siding	1	15	\$ 12.00	\$ 0.80	1	\$ 0.80
#8 x 1.25" Sheet Metal Screws (500 count)	1	500	\$ 3.29	\$ 0.01	17	\$ 0.11

#8 x 0.75" Sheet Metal Screws (500 count)	1	500	\$ 3.00	\$ 0.01	4	\$ 0.02
0.5-inch EMT Conduit (10 feet)	1	1	\$ 2.81	\$ 2.81	0.6	\$ 1.69
0.5-inch EMT conduit coupling	1	50	\$ 13.00	\$ 0.26	1	\$ 0.26
0.5-inch EMT pipe straps	1	100	\$ 13.00	\$ 0.13	2	\$ 0.26
3-inch x 10-feet PVC Pipe (predator guard)	1	5	\$ 14.60	\$ 2.92	1	\$ 2.92
3-inch PVC Pipe Cap	1	1	\$ 2.13	\$ 2.13	1	\$ 2.13
Reinforcing Steel stake (#4 x 4-feet length)	1	1	\$ -	\$ -	1	\$ -
						\$ 8.86

Other Materials Not On Cost List

Variable speed drill or cordless screw gun

Pencils and/or markers

1.5-inch & 0.75-inch diameter drill bits (spade bit or hole saws)

Squares, tape measures, rulers, etc.

PVC cement for predator guard construction

Manual pipe cutter

1/16 inch drill bits for pre-drilling holes

Saw(s) for cutting pieces to length

Scrap wood for constructing jigs/templates for easier construction.

(This is especially helpful for young people or others not accustomed to using power tools).

1/4-inch drive bits for sheet metal screws

Lesson Plan #1

Title: Getting Started

Curriculum Area(s): Language Arts/Reading

Grade Level: Grade 5-8

Purpose: To prepare students for the bluebird trail by researching vocabulary words related to the unit.

Objectives:

- 1) Students will investigate the natural history of bluebirds and other cavity nesting birds and expand their science vocabulary.
- 2) Students will help each other understand the new vocabulary words through a game.

Equipment Needed: Computers for online research, books on bluebirds, field guides, breeding bird atlases, bell, buzzer or some other way for teams to show they are ready to answer.

Materials Needed: Printout from online resources if computer access is limited, pencils, paper for notes, vocabulary words either printed on board or passed out to individuals, 4X6 note cards

Vocabulary:

Adult	Feral	Native species
Berries	Fledgling	Nest Box
Bird	Habitat	Nestling
Bluebird	Harbinger	Ornithologist
Bluebird Trail	Hover	Population
Brood	Incubation	Predator
Cavity	Insecticides	Prey
Cavity Nester	Insectivore	Range
Chickadee	Invasive species	Species
Conservation	Juvenile	Sialia
Eggs	Migration	Thrush
Excavate	Monitor	

Directions:

- 1) Tell students that you are passing out the answers! Yay! Then tell them they need to write the questions after doing some online or book research.
- 2) Pass out the vocabulary list or write the words on the board. The students should each choose 10 words to research.

- 3) Pass out the 4X6 note cards. Write the answers (vocabulary words) on one side and have the students write a bluebird related question that matches the answer on the other side.
Examples: A. Insects Q. What food makes up most of a bluebird's summer diet?
A. Sialia Q. What is the genus name of bluebirds?
- 4) Divide the class into two teams. Each student should research 10 answers but the teams should make sure they have covered all the vocabulary words.
- 5) Give the students time to research – this can be a brief time or as long as you want depending on your class time. They should be taking notes and then creating questions as they go. Remind them that the questions must relate to bluebirds – not all their responses will work but this is ok and part of the game.
- 6) Gather the two teams together and have them look over their Questions. They should help each other select the best bluebird related Questions for the game.
- 7) You will be the game show host – think Jeopardy style. You will call out an Answer and the first team to buzz in will have the opportunity to read a matching Question. You are also the judge – if the answer isn't correct or "bluebirdy" enough the other team gets a chance to read their Question.
- 8) Feel free to stop and discuss a Question further – debate and discussion are extended ways of learning!

Conclusions

- Gather the best and most bluebirdy Questions for the students to use to study for review. Use them in a bluebird bulletin board. Use them to create quizzes or tests.
- Reward the student who wrote the most Questions used by the team with a pass to the front of the line, extra credit points or first dibs on the tools when building the bluebird boxes.
- Have students add to the Bluebird Q. and A. list as they learn more.

Lesson Plan #2

Title: On the Bluebird Trail

Curriculum Area(s): Science, Language Arts

Grade Level: Grade 5-8

Purpose: To allow students to use their observation skills to monitor different species of birds using the nest boxes along the bluebird trail and journal their experiences.

Objectives:

- 1) Students will note the weather, temperature, and barometric pressure each day of the week during the nest box monitoring unit.
- 2) Students will observe birds and other wildlife along the trail on box checking day.
- 3) Students will actively observe what species of birds are nesting in the boxes and make a decision to leave the nest alone or remove the nest based on their observations.
- 4) Students will collect data on the species that utilize each box, how many eggs are laid, how many chicks hatch, and make an inference on how many chicks fledge the nest.

Equipment Needed:

- Need - A bucket or bag to carry equipment – power screwdriver, hand screwdriver, mirror, gloves, camera, notebook and pencil, trash bags
- Good to Have Along - Binoculars, magnifying glass, bug boxes, etc. for collecting and observing other nature items on the trail
- Good to have in the classrooms - Field guides for commonly found birds and other wildlife. Tree and plant ID books are also beneficial if available
- A stepstool if the students have difficulty reaching the boxes
- A nest box camera would be very cool if finances are available

Materials Needed:

- Students should carry their own notebook, folder or clipboard with paper to make journal entries, sketches or other notes as well as writing utensils

Set up/Preparation:

- Build and install bluebird boxes around the property as early in the spring as possible. Students should be involved in the process at an appropriate level.
- Students should be prepared for the monitoring process ahead of time and know what to expect. Discussion of invasive species and the need to remove sparrow nest materials, eggs and young should happen before the students hit the trail.
- Weekly monitoring will cut down on the number of sparrow eggs you must remove and will keep you from finding hatched sparrows in the boxes. This will ultimately make the process easier for younger students.

Directions:

- 1) Check the weather for the week and select a day that will give you the best chance for getting outside – be flexible but try to space the monitoring days out evenly. Example – shoot for Wednesdays but be ready to go out Tuesday or Thursday if needed.
- 2) Ask students to keep appropriate shoes and jackets in the classroom for the duration of the bluebird unit. That way if it is really wet and muddy or cold they will always be prepared to go outside.
- 3) Divide the class into groups unless you have enough bluebird boxes for everyone to check their own box. The same person/group should check the same box each week for continuity. Groups of 3 to 4 work well as everyone will have a job. 1 opens the box, 2 checks the box and removes nest material/eggs as needed, 3 notes information and/or takes pictures 4 closes the box. Jobs should rotate each week.
- 4) Prepare to go outside. Check and note the weather including the temperature and barometric pressure if available. Put on outdoor shoes, jackets, etc. and gather the monitoring tools/stepstool.
- 5) Remind students what you are doing at each box. Students should be quiet and respectful of the wildlife so as not to scare or harass the parents or babies. The group checking the box will be on task so the rest of the class should be observing surrounding nature and making journal entries as you move along. Any exciting discoveries in the nest boxes/surrounding grounds should be shared with the entire class. Litter pick up along the way is important, too!
- 6) Checking a box starts with observing the box from afar – use binoculars if available. You might see a parent on the box or nearby the box. Approach the box quietly. Knock on the box and watch/listen – baby birds cheeping or rustling feathers of a parent on the nest. Be prepared for a parent to rush off the nest when you open the box.
- 7) Nest inside the box? Make observations to conclude who built it. A messy nest that fills the box and includes trash is probably a house sparrow – remove it and put it in a trash bag to be thrown away later. Flat neat grassy nests are probably a bluebird. Grassy nest lined with feathers is usually a swallow. Nests made from soft mosses and lichens could be a chickadee. Nests made from twigs and grapevines are made by wrens. If you have a grassy nest start that doesn't have any definitive characteristics then leave it alone till next week. It is better to leave the nest for a week if you aren't sure who built it.
- 8) Nest with eggs? Checking for eggs is a gentle process – do not pick up the eggs unless you are absolutely sure they are sparrow. The mirror is a useful tool for egg ID. If it is an English Sparrow nest then remove the nest and the eggs and dispose of them in the trash. Leaving the nest materials around the box just gives the sparrows the material to start over with the next day. White eggs = swallows, bluish eggs = bluebirds, and speckled eggs in a mossy nest could be chickadees. You will have to use your powers of observation and make some good guesses to identify the

nest and eggs each week. Seeing an adult bird on the box is a good clue but not always the correct answer!

- 9) When you find a nest that you leave alone (bluebird, wren, swallow, chickadee) you will need to be cautious when opening the nest over the next few weeks. The parents will defend a nest with eggs/young and may swoop down over your heads to threaten you. **DO NOT BE AFRAID!** They cannot hurt you but they can be startling if you are not ready for them. You must also keep track of how old the babies are each week. Do not open a box after the babies are about 2 weeks old as they are getting ready to fledge and may leave the box too early if you startle them out. Listen at the box for chirping and leave the box unopened until you are sure the babies have fledged.
- 10) Move from box to box with each group taking the lead. Gather at the end of the trail and recap what each box had in it and what actions you took.
- 11) Return to the classroom and update your data sheet or go online to update your entry if you are participating in something like Nestwatch.org or eBird.org. Compare/contrast with data from previous years if the nest box monitoring has been going on for a few years. Have students finish journal entries, look up items noticed along the trail, etc.
- 12) Throw away trash and/or sparrow nests. Re-charge electric screwdriver. Return equipment, bucket/bag, etc. to its correct place.

Conclusions

- Repeat each week through the end of the school year. Recruit families to help you monitor over the summer so your hard work in the spring doesn't go to waste. Birds will have several broods over a season so they nest through the entire summer.
- Investigate where bluebirds and other migratory birds go in the winter. Look at maps and compare breeding grounds versus wintering grounds. What birds stay all winter?
- Find a breeding bird atlas for your state or country that shows changes in populations over the years.

Lesson Plan #3

Title: Nestbox Shuffle

Curriculum Area(s): Music, Science, Math/Statistics

Grade Level: Grade 5-8

Purpose: To prepare students for the bluebird trail by investigating what makes suitable habitat and nesting locations for bluebirds and other cavity nesters.

Objectives:

- 1) Students will examine the four components of a habitat – food, water, shelter, space.
- 2) Students will consider the challenges bluebirds face from competitors and predators.
- 3) Students will investigate how humans can positively and negatively impact bluebird populations

Equipment Needed:

- A selection for students to read prior to the game that details what bluebirds require for suitable habitat – food, shelter, water, space.
- A set of chairs equal to half the number of participants.
- A white board for logging population data counts.
- A CD player or iPod with speakers to play spring-like music.

Materials Needed:

- A set of 3X5 cards equal to 2 and a half times the number of participants.
- Markers for writing on the 3X5 cards

Set up/Preparation:

Exact number of cards and chairs will vary according to the size of the class.

For a class of 20, 10 chairs will be needed. Set up the chairs as in musical chairs but space them out around the room a little bit. Bluebirds don't like to nest right next to each other.

For a class of 20, 50 3X5 cards will be needed. Divide the cards into 2 groups of 20 and one of 10. Print the following information on the groups:

- | | |
|------------------------------|---|
| 1st Group of 20: | on 10 (or half the cards) print SAFE NEST |
| | on 10 (or half the cards) print UNSAFE NEST |
| 2nd Group of 20: | on 10 (or half the cards) print BLUEBIRD |
| | on 10 (or half the cards) print a random choice of competitors
(English Sparrow, Starling, Raccoon, or Snake) |
| 3 rd Group of 10: | on ALL the cards print SAFE NEST |

Directions:

- 1) Have students read a selection that details what the habitat requirements are for bluebirds. Why did bluebird population numbers drop in the early 1900's? Discuss competition for nest cavities as well as loss of natural nest cavities.
- 2) Discuss what the property your bluebird trail has in the way of food, shelter, water and space for bluebirds. Is it good habitat? How can you make it better for bluebirds?
- 3) Discuss what makes a safe place to nest? Why are bluebird boxes along monitored trails helpful to bluebirds? (Specially designed nest boxes with predator guards and frequent monitoring to exclude competitors like sparrows and starlings and keep out predators like snakes and raccoons.
- 4) What other cavity nesting birds might benefit from nest boxes? Wrens, Swallows, Chickadees are examples in Ohio. These are all native birds and it is ok to support their populations with nest boxes.
- 5) To start the game, shuffle the nest cards and lay one face down on each chair. No one should see the cards that are on each chair.
- 6) Shuffle the second group of cards and give one to each participant – they make look at the card.
- 7) Each complete round of the game can be treated like a year. It is now springtime and each student who received a BLUEBIRD card can fly around the room and select a nest site (chair). There will be a nest for each bird at this point in the game. Play your spring-like music at this time. When the music stops, each BLUEBIRD should select the closest nest site. At first there should be a nest for each bird. **DO NOT LOOK AT THE CARDS ON THE CHAIRS YET!**
- 8) After the BLUEBIRDS have found a nest, the COMPETITORS (anyone who received a card other than BLUEBIRD) should begin to prowl...slither, crawl, flap their way around the chairs. Scary music would be suitable to play for the competitors at this time. When the music stops, the COMPETITORS should choose the next closest to them.
- 9) At this time, the players can look at the cards on the chairs. If it is a SAFE NEST the BLUEBIRD gets to stay. If it is an UNSAFE NEST, the BLUEBIRD leaves and the COMPETITOR stays. At the end of each round, write the number of SAFE NESTS and surviving BLUEBIRDS for that year.
- 10) Play a couple rounds of the game so everyone gets the hang of it. Shuffle the cards for the chairs and for the wildlife each time to mix things up.
- 11) Now start changing the habitat a bit by removing chairs. Discuss what habitat destruction means for nest sites. Large groups can have more chairs removed to save time. As with musical chairs, the BLUEBIRDS who do not find a nest when the music stops are out for that round. Not everyone will find a nest site at this stage of the game. Keep removing chairs with each round until few or no BLUEBIRDS survive.
- 12) **IMPORTANT!** For every chair removed, remove one competitor card and one bluebird card from the second deck before shuffling and dealing. Make sure anyone who gets left out for a round gets back in the next round to keep everyone involved.
- 13) Now demonstrate how a properly monitored Bluebird Trail can help stabilize or increase a bluebird population. Play one more round with all the chairs and all the cards back in the deck. This time, use the 3rd deck of cards on the chairs so that every chair is a SAFE

NEST site. Do not let the students see the cards. All the BLUEBIRDS will survive this round with the COMPETITORS losing out this time.

Conclusions

- Discuss other ways a habitat may be effected besides habitat loss or destructions (drought, flood, very cold or very hot weather, pesticide use, etc) and add those changes to the game when removing chairs.
- For advanced groups you could expand the BLUEBIRDS to include other native cavity nesters such as WRENS, SWALLOWS, CHICKADEES
- Graph the population changes as they relate to the number of safe nest sites.

Lesson Plan #4

Title: Signs of Spring

Curriculum Area(s): Language Arts/Visual Arts

Grade Level: Grade 5-8

Purpose: To allow students to examine nature for signs of spring and express their thoughts and feelings about nature through poetry and art.

Objectives:

- 1) Students will investigate the grounds looking for signs of spring while performing their weekly nest box monitoring duty.
- 2) Students will look for colors and shapes found in nature.
- 3) Students will combine their observations into an illustrated poem using key vocabulary words in the poem or illustration.

Equipment Needed: Monitoring bag, stepstool, bag of miscellaneous markers or crayons, bag of miscellaneous shapes, bag of vocabulary words related to the bluebird monitoring process (enough in each bag so students can choose at least 3)

Materials Needed: Paper for poem and illustration

Vocabulary: Print each on a slip of paper – there should be enough for 3 per person.

Adult	Hover	Sialia
Berries	Incubation	Swallow
Bird	Insect	Thrush
Birdsong	Insectivore	Wildflowers
Bluebird	Invasive species	Grass
Bluebird Trail	Juvenile	Twigs
Brood	Migration	Moss
Cavity	Monitor	Feathers
Cavity Nester	Moth	Weave
Caterpillar	Native species	Wren
Chick	Nest	
Chickadee	Nest Box	
Conservation	Nestling	
Eggs	Ornithologist	
Excavate	Population	
Fledgling	Predator	
Habitat	Prey	
Harbinger	Range	
Hatch	Species	

Directions:

- 1) This activity can be done in conjunction with your weekly monitoring walk or by itself. Gather 3 bags: 1 of crayon/markers/colored pencils, 1 of shapes (circles, triangles, squares, rectangles, ovals, diamonds, and half circles) and 1 of vocabulary words. The bags should contain enough items so each student can select at least 3 from each bag.
- 2) Give instructions before going outside. Students select 3 items from each bag at the start of the walk then look for things that match the colors, shapes and words that they chose.
- 3) Look for signs of spring...
Wildlife returning from migration (red winged blackbirds, swallows, bluebirds, ducks, geese, warblers, etc.)
Wildlife re-appearing from Hibernation/Torpor (frogs, toads, turtles, insects, bats, chipmunks, groundhogs, bears!)
New growth in plants (grass is greener, trees are budding or leafing out, flowers are blooming)
Sounds – insects buzzing, birds singing, frogs calling, etc.
Smells – wet earth, sweet flowers, etc.
Signs of spring and babies – bird and squirrel nests in trees and bushes, fresh digging around burrows in the grounds, birds singing their courting songs or territorial calls, more wildlife out and about looking for a mate, defending their territory or looking for food for their young.
- 4) Begin matching the items the students selected from the bags to things they are observing as they walk. They should be matching the colors and shapes to natural items (may need to discuss man-made vs. nature) and noting their finds in their journal. Have everyone read their vocabulary words out loud so the entire class can help match the words to things they are seeing, smelling or hearing.
- 5) Stop at the end of the hike and check to see if everyone has noted at least one nature observation for each color, shape and vocabulary word. Take a moment to re-cap some things that were observed and/or assist anyone who has not found all their matches yet.
- 6) Return to the classroom and allow students to update their journal entries about the hike. Ask them to write a signs of spring poem and create an illustration using the observations and colors, shapes and words that they selected.

Conclusions

- Make a list of each shape and color on the board and have students list what natural items they found that matched the shapes and colors.
- Discuss migration and take a look at maps showing the migration patterns of birds, bats and insects found in your area.
- Display the poetry in the hall or with your bluebird nest box bulletin board